PHILIPS 28PT4458

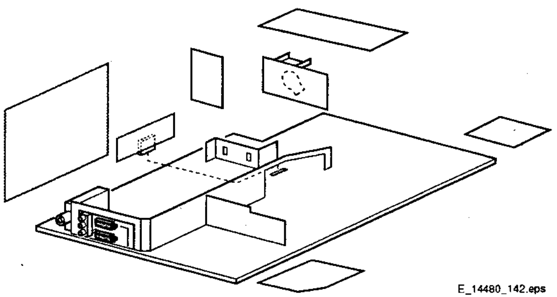
MODEL

SERVICE MANUAL

Colour Television

Chassis L04E AA

Service
Service
Service



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Service Manual

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1. Technical Specifications, Connections, and Chassis Overview

Notes:

- Described specifications are valid for the *whole* product range.
- Figures below can deviate slightly from the actual situation, due to different set executions.

1.1 Technical Specifications

1.1.1 Vision

Display type	: DV-CRT-RF
	: DV-CRT-FSQ
	: DV-CRT-SF
Screen size	: 21" (55 cm), 4:3
	: 24" (61 cm), 16:9
	: 25" (63 cm), 4:3
	: 28" (70 cm), 4:3
	: 29" (72 cm), 4:3
	: 32" (82 cm), 16:9
Tuning system	: PLL
TV Colour systems	: PAL B/G, B/H, D/K, I
	: SECAM
	: SECAM B/G, D/K, L/L'
Video playback	: NTSC
Channel selections	: 100 presets
	: UVSH
Aerial input	: 75 ohm, Coax
	: IEC-type

1.1.2 Sound

Sound systems	: NICAM Stereo
Maximum power	: 2x10/ 2x5 W_rms (int.)

1.1.3 Miscellaneous

Power supply:	
- Mains voltage	: 220 - 240 V_ac
- Mains frequency	: 50/60 Hz
Ambient conditions:	
- Temperature range	: +5 to +40 deg. C
- Maximum humidity	: 90 % R.H.
Power consumption	
- Normal operation	: from 60 W (21")
	: to 91 W (32")
- Standby	: < 1 W

1.2 Connections

Note: The following connector colour abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, Ye= Yellow.

1.2.1 Side Connections

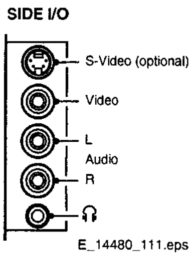

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Figure 1-1 Side I/O

SVHS: Y/C - In (Hosiden) (optional)

1	- Ground	Gnd	⏚
2	- Ground	Gnd	⏚
3	-Y	1 V_pp / 75 ohm	⊕
4	-C	0.3 V_pp / 75 ohm	⊕

Audio / Video In

Ye	-Video (CVBS)	1 V_pp / 75 ohm	⊕◎
Wh	-Audio - L	0.5 V_rms / 10 kohm	⊕◎
Rd	-Audio - R	0.5 V_rms / 10 kohm	⊕◎
Bk	-Headphone	8 - 600 Ohm / 4 mW	◎/∩

1.2.2 Rear Connections

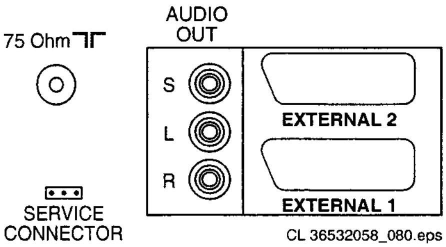

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Figure 1-2 Rear connections

Aerial In

	- F-type	Coax, 75 ohm	⊤

Audio Out

1	- Subwoofer	Var. level (optional)	⊖◎
Wh	- Audio - L	0.5 V_rms / 1 kohm	⊖◎
Rd	- Audio - R	0.5 V_rms / 1 kohm	⊖◎

External 1: RGB/YUV - In and CVBS - In/Out

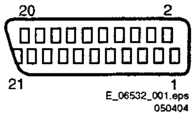
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Figure 1-3 SCART connector

1	- Audio - R	0.5 V_rms / 1 kohm	⊖→
2	- Audio - R	0.5 V_rms / 10 kohm	→⊖
3	- Audio - L	0.5 V_rms / 1 kohm	⊖→
4	- Audio - gnd	Ground	⏚
5	- Blue - gnd	Ground	⏚
6	- Audio - L	0.5 V_rms / 10 kohm	→⊖
7	- Blue/U - in	0.7 V_pp / 75 ohm	→⊖
8	- CVBS - status	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	
9	- Green - gnd	Ground	⏚
10	- n.c.		
11	- Green/Y - in	0.7 V_pp / 75 ohm	→⊖
12	- n.c.		
13	- Red - gnd	Ground	⏚
14	- FBL - gnd	Ground	⏚
15	- Red/V - in	0.7 V_pp / 75 ohm	→⊖
16	- Status/FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	→⊖
17	- Video	Ground	⏚
18	- Video	Ground	⏚
19	- CVBS - out	1 V_pp / 75 ohm	⊖→
20	- CVBS - in	1 V_pp / 75 ohm	→⊖
21	- Shielding	Ground	⏚

External 2: CVBS- In and SVHS - In

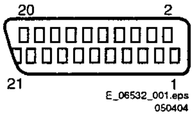
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Figure 1-4 SCART connector

1	- Audio - R	0.5 V_rms / 1 kohm	⊖→
2	- Audio - R	0.5 V_rms / 10 kohm	→⊖
3	- Audio - L	0.5 V_rms / 1 kohm	⊖→
4	- Audio - gnd	Ground	⏚
5	- Blue - gnd	Ground	⏚
6	- Audio - L	0.5 V_rms / 10 kohm	→⊖
7	- n.c.		
8	- CVBS - status	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	
9	- Green - gnd	Ground	⏚
10	- n.c.		
11	- n.c.		
12	- n.c.		
13	- Red - gnd	Ground	⏚
14	- FBL - gnd	Ground	⏚
15	- YC-C - in	0.7 V_pp / 75 ohm	→⊖
16	- n.c.		
17	- Video	Ground	⏚
18	- Video	Ground	⏚
19	- CVBS - out	1 V_pp / 75 ohm	⊖→
20	- Y/CVBS - in	1 V_pp / 75 ohm	→⊖
21	- Shielding	Ground	⏚

1.3 Chassis Overview

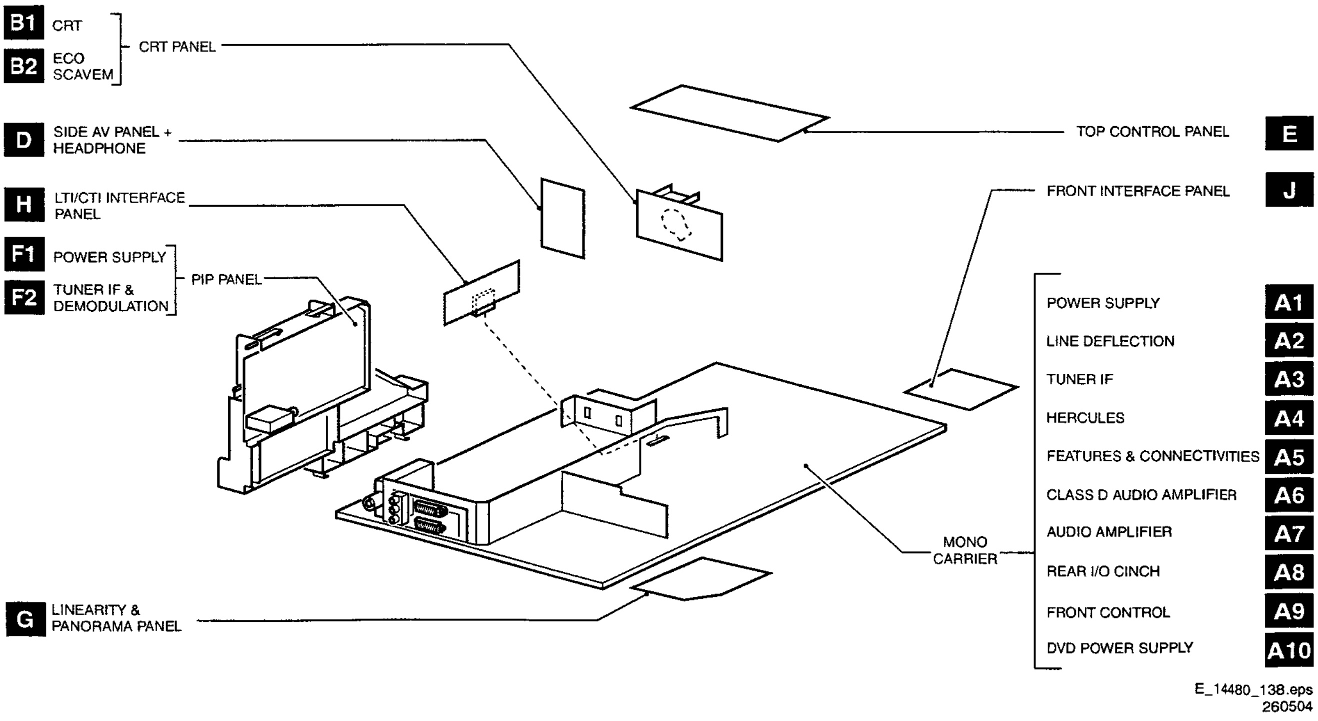
B1 CRT
B2 ECO SCAVEM
CRT PANEL
D SIDE AV PANEL + HEADPHONE
H LTI/CTI INTERFACE PANEL
F1 POWER SUPPLY
F2 TUNER IF & DEMODULATION
PIP PANEL
G LINEARITY & PANORAMA PANEL
TOP CONTROL PANEL E
FRONT INTERFACE PANEL J
POWER SUPPLY A1
LINE DEFLECTION A2
TUNER IF A3
HERCULES A4
FEATURES & CONNECTIVITIES A5
CLASS D AUDIO AMPLIFIER A6
AUDIO AMPLIFIER A7
REAR I/O CINCH A8
FRONT CONTROL A9
DVD POWER SUPPLY A10
MONO CARRIER
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Figure 1-5 PWB location

2. Safety and Maintenance Instructions, Warnings, and Notes

2.1 Safety Instructions

Safety regulations require that **during** a repair:

- Due to the chassis concept, a very large part of the circuitry (incl. deflection) is 'hot'. Therefore, connect the set to the mains via an isolation transformer.
- Replace safety components, indicated by the symbol ▲, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.
- Wear safety goggles when you replace the CRT.

Safety regulations require that **after** a repair, you must return the set in its original condition. Pay, in particular, attention to the following points:

- General repair instruction: as a strict precaution, we advise you to re-solder the solder connections through which the horizontal deflection current is flowing. In particular this is valid for the:
  1. Pins of the line output transformer (LOT).
  2. Fly-back capacitor(s).
  3. S-correction capacitor(s).
  4. Line output transistor.
  5. Pins of the connector with wires to the deflection coil.
  6. Other components through which the deflection current flows.

Note: This re-soldering is advised to prevent bad connections due to metal fatigue in solder connections, and is therefore only necessary for television sets more than two years old.

- Route the wire trees and EHT cable correctly and secure them with the mounted cable clamps.
- Check the insulation of the mains cord for external damage.
- Check the strain relief of the mains cord for proper function, to prevent the cord from touching the CRT, hot components, or heat sinks.
- Check the electrical DC resistance between the mains plug and the secondary side (only for sets that have an isolated power supply). Do this as follows:
  1. Unplug the mains cord and connect a wire between the two pins of the mains plug.
  2. Turn on the main power switch (keep the mains cord unplugged!).
  3. Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection of the set. The reading should be between 4.5 MΩ and 12 MΩ.
  4. Switch the TV 'off' and remove the wire between the two pins of the mains plug.
- Check the cabinet for defects, to prevent the possibility of the customer touching any internal parts.

2.2 Maintenance Instructions

We recommend a maintenance inspection carried out by qualified service personnel. The interval depends on the usage conditions:

- When a customer uses the set under normal circumstances, for example in a living room, the recommended interval is three to five years.
- When a customer uses the set in an environment with higher dust, grease, or moisture levels, for example in a kitchen, the recommended interval is one year.
- The maintenance inspection includes the following actions:
  1. Perform the 'general repair instruction' noted above.
  2. Clean the power supply and deflection circuitry on the chassis.
  3. Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

- In order to prevent damage to ICs and transistors, avoid all high voltage flashovers. In order to prevent damage to the picture tube, use the method shown in Fig. 2-1, to discharge the picture tube. Use a high voltage probe and a multi-meter (position V_dc). Discharge until the meter reading is 0 V (after approx. 30 s).

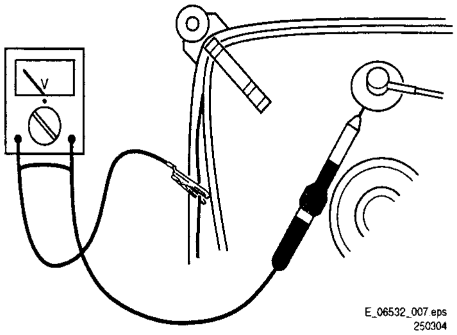


Figure 2-1 Discharge picture tube

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD, ⚠). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this potential. Available ESD protection equipment:
  - Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and ground cable) 4822 310 10671.
  - Wristband tester 4822 344 13999.
- Together with the deflection unit and any multi-pole unit, flat square picture tubes form an integrated unit. The deflection and the multi-pole units are set optimally at the factory. We do not recommend adjusting this unit during repair.
- Be careful during measurements in the high voltage section and on the picture tube.
- Never replace modules or other components while the unit is 'on'.
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.4 Notes

2.4.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry.
- The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a color bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (ℿ) and without (⌧) aerial signal. Measure the voltages in the power supply section both in normal operation (Ⓘ) and in standby (⏻). These values are indicated by means of the appropriate symbols.

- The picture tube panel has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

2.4.2 Schematic Notes

- All resistor values are in ohms and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are expressed in micro-farads (μ= x 10^-6), nano-farads (n= x 10^-9), or pico-farads (p= x 10^-12).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Electrical Replacement Parts List. Therefore, always check this list when there is any doubt.

2.4.3 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions - reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.
- **Before powering up the TV set with the back cover off** (or on a test fixture), attach a clip lead to the CRT DAG ground and to a screwdriver blade that has a well insulated handle. After the TV is powered "on" and high voltage has developed, probe the anode lead with the blade, starting at the case of the High Voltage Transformer (flyback - IFT). Move the blade to within two inches of the connector of the CRT. **If there is an arc, you found it the easy way, without getting a shock!** If there is an arc to the screwdriver blade, replace the part that is causing the problem: the High Voltage Transformer or the lead (if it is removable).

2.4.4 Lead Free Solder

This set is manufactured with lead-free production technology. This is also indicated on the PWB by the PHILIPS lead-free logo (either by a service-printing or by a sticker).

Figure 2-2 Lead-free logo

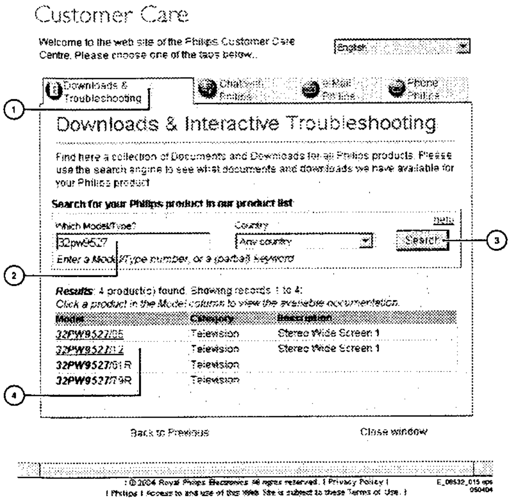
This set is produced with lead-free solder alloy as well as with lead-free sub-parts. It can be considered as lead-free.
Due to this fact, some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment.
- Use only adequate solder tools applicable for lead-free soldering tin.
- Adjust your solder tool so that a temperature around 217 - 220 deg. C is reached at the solder joint.
- Do not mix lead-free soldering tin with leaded soldering tin; this will lead to unreliable solder joints!
- Use only original spare parts listed in this manual. These are lead-free parts!
- On the website *www.atyourservice.ce.philips.com* you can find more information on:
  - Aspects of lead-free technology.
  - BGA (de-)soldering, heating-profiles of BGAs used in Philips sets, and others

3. Directions for Use

You can download this information from the following website:
http://www.philips.com/support

1. Click on "Downloads and Troubleshooting" [1].
2. Fill in the TV model/type number in the field "Which Model/Type?" [2] and click on "Search" [3].
   Note: The correct model/typenumber can be found on the rear cover of the set. If you do not have the complete model/typenumber, just fill in e.g. "32PW95" or "PW95" (do not use wildcards).
3. When results are returned, click on the desired model/typenumber under "Model" [4].
4. Now, click on the "Owner's manual" [5] in the desired language. To read/open the PDF files you can download and install the free Acrobat Reader
   http://www.adobe.com/products/acrobat/readstep2.html



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Country: Any country

Enter a Model/Type number, or a (partial) keyword

Results: 4 product(s) found. Showing records 1 to 4:
Click a product in the Model column to view the available documentation.

Model	Category	Description
32PW9527/05	Television	Stereo Wide Screen 1
32PW9527/12	Television	Stereo Wide Screen 1
32PW9527/01R	Television	
32PW9527/79R	Television	

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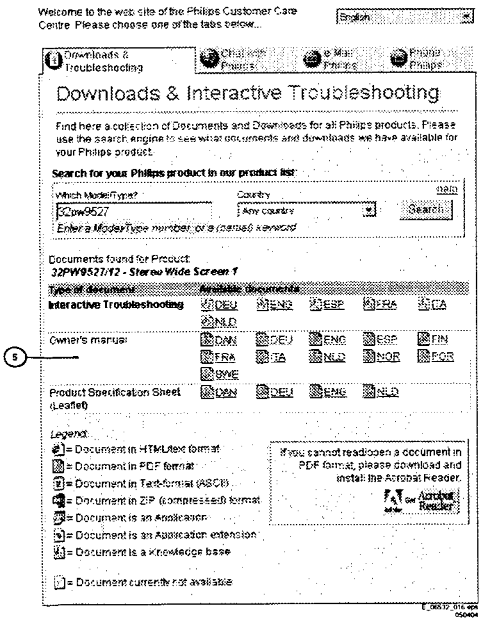
Figure 3-1 Screenshot DFU website (1)



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Documents found for Product:
32PW9527/12 - Stereo Wide Screen 1

Type of document	Available documents
Interactive Troubleshooting	DEU ENG ESP FRA ITA NLD
Owner's manual	DAN DEU ENG ESP FIN FRA ITA NLD NOR POR SWE
Product Specification Sheet (Leaflet)	DAN DEU ENG NLD

Legend:
= Document in HTML/text format
= Document in PDF format
= Document in Text-format (ASCII)
= Document in ZIP (compressed) format
= Document is an Application
= Document is an Application extension
= Document is a Knowledge base
= Document currently not available

If you cannot read/open a document in PDF format, please download and install the Acrobat Reader.

Figure 3-2 Screenshot DFU website (2)

4. Mechanical Instructions

Index of this chapter:

1. Set Disassembly
2. Service Position
3. Assies/Panels Removal
4. Set Re-assembly

Note: Figures below can deviate slightly from the actual situation, due to different set executions.

4.1 Set Disassembly

Warning: Be sure to disconnect the AC power from the set before opening it.

4.1.1 Rear Cover

1. Remove all fixation screws of the rear cover (do not forget the screws that hold the rear connection panel).
2. Pull the rear cover backwards to remove it.

4.2 Service Position

Before placing the Mono Carrier in its service position, remove the Front Interface assy/panel (see paragraph "Front Interface Assy/Panel removal"), the Side AV assy/panel (see paragraph "Side AV Assy/Panel removal") and the PIP assy/panel (if exists) (see paragraph "PIP Assy/Panel removal").

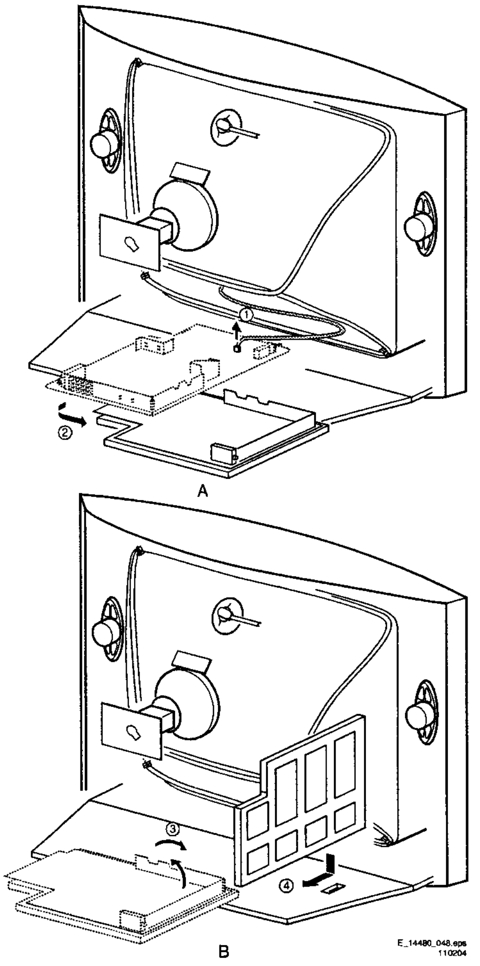

Figure 4-1 Service position Mono Carrier

1. Disconnect the degaussing coil [1].
2. Release the two fixation clamps (at the mid left and mid right side of the bracket), and remove the bracket from the bottom tray, by pulling it backwards [2].
3. Turn the chassis tray 90 degrees counter clockwise.
4. Move the panel bracket somewhat to the left and flip it 90 degrees [3], with the components towards the CRT.
5. Turn the panel bracket with the rear I/O toward the CRT.
6. Place the hook of the tray in the fixation hole of the cabinet bottom [4] and secure it.

4.3 Assies/Panels Removal

4.3.1 Front Interface Assy/Panel Removal

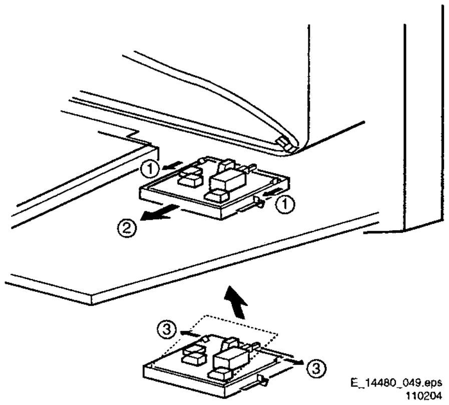

Figure 4-2 Front interface assy/panel removal

1. Remove the complete module from the bottom plate, by pulling the two fixation clamps upward [1], while sliding the module away from the CRT [2].
   Note: these clamps are difficult to access.
2. Release the two fixation clamps [3] at the side of the bracket, and lift the panel out of the bracket (it hinges at one side).

4.3.2 Side AV Assy/Panel Removal

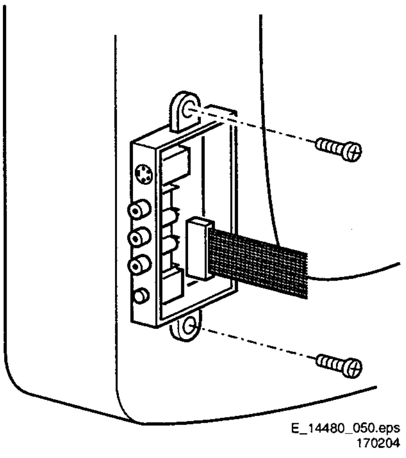

Figure 4-3 Side AV assy/panel removal

1. Remove the two fixation screws, and remove the complete Side AV assembly.
2. Release the two fixation clamps, and lift the panel out of the bracket.

4.3.3 LTI/CTI Interface Panel Removal

Remove the LTI/CTI Interface panel from the Mono Carrier, by disconnecting it from connector 1212.

4.3.4 Top Control Assy/Panel Removal

Notes:
- PV02 styling: assy is mounted in the front cabinet;
- FL13B styling: assy is mounted in the rear cover.

1. Remove the two fixation screws.
2. Push the assy a little bit upwards, and then pull it backwards to release it from the front hinge.
3. Lift the panel from its bracket, while releasing the four fixation clamps.

4.3.5 Linearity Assy/Panel Removal

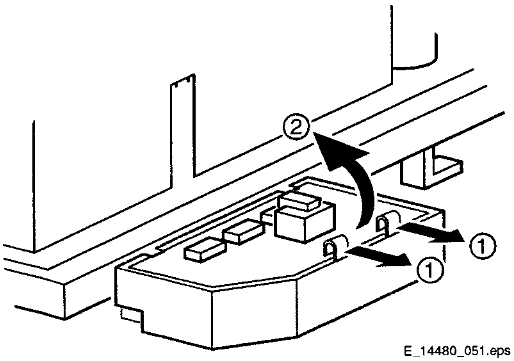

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Figure 4-4 Linearity assy/panel removal

1. Release the two fixation clamps [1] to lift the panel out of the bracket [2].

4.3.6 PIP Assy/Panel Removal

1. Release the two fixation clamps to lift the panel out of the bracket.

4.4 Set Re-assembly

To re-assemble the whole set, do all processes in reverse order.

Note: before you mount the rear cover, perform the following checks:
1. Check whether the AC power cord is mounted correctly in its guiding brackets.
2. Check whether all cables are replaced in their original position

5. Service Modes, Error Codes, and Fault Finding

Index:

1. Test Points.
2. Service Modes.
3. Problems and Solving Tips (related to CSM).
4. ComPair.
5. Error Codes.
6. The Blinking LED Procedure.
7. Protections.
8. Repair Tips.

5.1 Test Points

The chassis is equipped with test points printed on the circuit board assemblies. These test points refer to the functional blocks:

Table 5-1 Test point overview

Test point	Circuit	Diagram
F508, F535, F536, F537, F552, F561, F563, F573, F664,I513, I518, I519, I524, I531, I533, I546	Power supply	A1
F401, F412, F413, F414, F418, F452, F453, F455, F456, F458, F459, F460, F461, I408, I416, I417, I420, I462, I468	Line + Frame Deflection	A2
F003, F004, I001, I002	Tuner IF	A3
F201, F203, F205, F206	Hercules	A4
F240, F241, F242	Features & Connectivities	A5
F952, F955, I951, I952	Audio Amplifier	A7
F692	Front Control	A9
F331, F332, F333, F338, F339, F341, F351, F353, F354	CRT Panel	B1
F361, F362, F381, F382	ECO Scavem	B2

Perform measurements under the following conditions:

- Television set in Service Default Alignment Mode.
- Video input: Colour bar signal.
- Audio input: 3 kHz left channel, 1 kHz right channel.

5.2 Service Modes

Service Default mode (SDM) & Service Alignment Mode (SAM) offers several features for the service technician, while the Customer Service Mode (CSM) is used for communication between the call centre and the customer.

This chassis also offers the option of using ComPair, a hardware interface between a computer and the TV chassis. It offers the abilities of structured troubleshooting, error code reading, and software version readout for all these chassis. *Minimum requirements for ComPair:* a Pentium processor, a Windows OS, and a CD-ROM drive (see "ComPair" section).

Table 5-2 Software cluster overview

SW Clusters	SW Version	First Mask	Remarks
L4LEF1	L04EF11.0	TDA12020H1/N1B11	Western Europe
		TDA12021H1/N1B11	Radio 4:3 set only.
L4LEF2	L04EF21.0	TDA12020H1/N1B11	Eastern Europe
		TDA12021H1/N1B11	Radio 4:3 set only.
L4LEF3	L04EF31.0	TDA12020H1/N1B11	Western Europe
		TDA12021H1/N1B11	PIP
L4LEF4	L04EF41.0	TDA12020H1/N1B11	Eastern Europe
		TDA12021H1/N1B11	PIP
L4LEF5	L04EF51.0	TDA12020H1/N1B11	Western Europe
		TDA12021H1/N1B11	Radio & PIP.
L4LEF6	L04EF61.0	TDA12020H1/N1B11	Eastern Europe
		TDA12021H1/N1B11	Radio & PIP.
L4LEF7	L04EF71.0	TDA12020H1/N1B11	ICON UI

5.2.1 Service Default Mode (SDM)

Purpose

- To create a predefined setting for measurements to be made.
- To override software protections.
- To start the blinking LED procedure.

Specifications

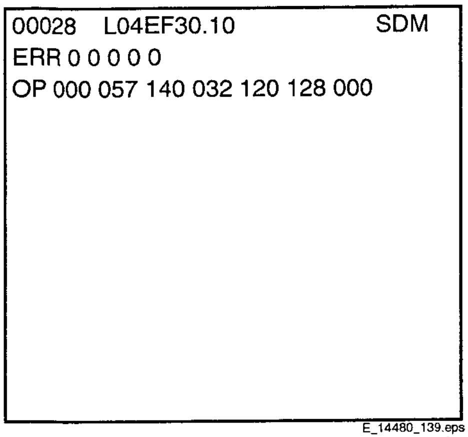
- Tuning frequency: 475.25 MHz.
- Colour system: PAL/SECAM.
- All picture settings at 50%
  (brightness, colour contrast, hue).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled. The service unfriendly modes are:
  - Timer / Sleep timer.
  - Child / parental lock.
  - Blue mute.
  - Hotel / hospital mode.
  - Auto shut off (when no 'IDENT' video signal is received for 15 minutes).
  - Skipping of non-favourite presets / channels.
  - Auto-storage of personal presets.
  - Auto user menu time-out.
  - Auto Volume Levelling (AVL).

How to enter

To enter SDM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: **'0 6 2 5 9 6'** directly followed by the **'MENU'** button (do not allow the display to time out between entries while keying the sequence).
- Short jumper wires 9252 and 9275 on the family board (see Fig. 8-1) and apply mains. Then press the power button (remove the short after start-up).
  Caution: Entering SDM by shorting wires 9252 and 9275 will override the +8V-protection. Do this only for a short period. When doing this, the service-technician must know exactly what he is doing, as it could damage the television set.
- Or via ComPair (with the ComPair 'Tools', it should be possible to enter SDM via the ComPair interface).

After entering SDM, the following screen is visible, with SDM in the upper right corner of the screen to indicate that the television is in Service Default Alignment Mode.



```
00028   L04EF30.10                SDM
ERR 0 0 0 0 0
OP 000 057 140 032 120 128 000
```

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Figure 5-1 SDM menu

How to navigate

Use one of the following methods:

- When you press the MENU button on the remote control, the set will switch on the normal user menu in the SDM mode.
- On the TV, press and hold the 'VOLUME down' and press the 'CHANNEL down' for a few seconds, to switch from SDM to SAM and reverse.

How to exit

Switch the set to STANDBY by pressing the POWER button on the remote control transmitter or the television set.
If you turn the television set off by removing the Mains (i.e., unplugging the television) without using the POWER button, the television set will remain in SDM when mains is re-applied, and the error buffer is not cleared.

5.2.2 Service Alignment Mode (SAM)

Purpose

- To change option settings.
- To display / clear the error code buffer.
- To perform alignments.

Specifications

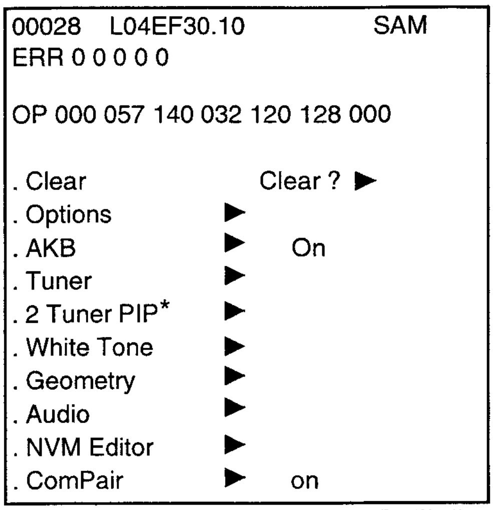
- Run timer (maximum five digits displayed)
- Software version, Error & Option Bytes display
- Clear error buffer.
- Option settings
- AKB switching
- Software alignments (Tuner, 2 Tuner PIP, White Tone, Geometry & Audio)
- NVM Editor
- ComPair Mode switching

How to enter

To enter SAM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: '**0 6 2 5 9 6**' directly followed by the "On Screen Display icon "i +" button (do not allow the display to time out between entries while keying the sequence).
- Or via ComPair.

After entering SAM, the following screen is visible, with SAM in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.



```
00028   L04EF30.10              SAM
ERR 0 0 0 0 0

OP 000 057 140 032 120 128 000

. Clear                 Clear ? ►
. Options          ►
. AKB              ►      On
. Tuner            ►
. 2 Tuner PIP*     ►
. White Tone       ►
. Geometry         ►
. Audio            ►
. NVM Editor       ►
. ComPair          ►      on
```

* optional

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Figure 5-2 SAM menu

Menu explanation

1. **LLLLL.** This represents the run timer. The run timer counts normal operation hours, but does not count standby hours (maximum four digits displayed).
2. **AAABCD-X.Y.** This is the software identification of the main microprocessor:
   - **A** = the project name (L04).
   - **B** = the region: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM.
   - **C** = the software diversity:
     - **Europe:** T = 1 page TXT, F = Full TXT, V = Voice control.
     - **LATAM and NAFTA:** N = Stereo non-dBx, S = Stereo dBx.
     - **Asian Pacific:** F = Full TXT, N = non TXT, C = NTSC.
     - **ALL regions:** M = mono, D = DVD, Q = Mk2.
   - **D** = the language cluster number.
   - **X** = the main software version number (updated with a major change that is incompatible with previous versions).
   - **Y** = the sub software version number (updated with a minor change that is compatible with previous versions).
3. **SAM.** Indication of the Service Alignment Mode.
4. **Error Buffer.** Shows all errors detected since the last time the buffer was erased. Five errors possible.
5. **Option Bytes.** Used to set the option bytes. See 'Options' in the Alignments section for a detailed description. Seven codes are possible.
6. **Clear.** Erases the contents of the error buffer. Select the CLEAR menu item and press the MENU RIGHT key. The content of the error buffer is cleared.
7. **Options.** Used to set the option bits. See 'Options' in the Alignments section for a detailed description.
8. **AKB.** Used to disable (Off) or enable (On) the 'black current loop' (AKB = Auto Kine Bias).
9. **Tuner.** Used to align the tuner. See 'Tuner' in the Alignments section for a detailed description.
10. **2 Tuner PIP.** Used to align the tuner PIP (optional)
11. **White Tone.** Used to align the white tone. See 'White Tone' in the Alignments section for a detailed description.
12. **Geometry.** Used to align the geometry settings of the television. See 'Geometry' in the Alignments section for a detailed description.
13. **Audio.** No audio alignment is necessary for this television set.

14. **NVM Editor.** Used to change the NVM data in the television set.
15. **ComPair Mode.** Used to switch on the television to ISP mode (for uploading software)

How to navigate

- In SAM, select menu items with the MENU UP/DOWN keys on the remote control transmitter. The selected item will be highlighted. When not all menu items fit on the screen, use the MENU UP/DOWN keys to display the next / previous menu items.
- With the MENU LEFT/RIGHT keys, it is possible to:
  - Activate the selected menu item.
  - Change the value of the selected menu item.
  - Activate the selected submenu.
- In SAM, when you press the MENU button twice, the set will switch to the normal user menus (with the SAM mode still active in the background). To return to the SAM menu press the MENU or STATUS/EXIT button.
- When you press the MENU key in while in an SDAM submenu, you will return to the previous menu.

How to store SAM settings

To store settings changed in SAM leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set.

How to exit

Switch the set to STANDBY by pressing the POWER button on the remote control transmitter or the television set.
If you turn the television set off by removing the mains (i.e., unplugging the television) without using the POWER button, the television set will remain in SAM when mains is re-applied, and the error buffer is not cleared.

5.2.3 Customer Service Mode (CSM)

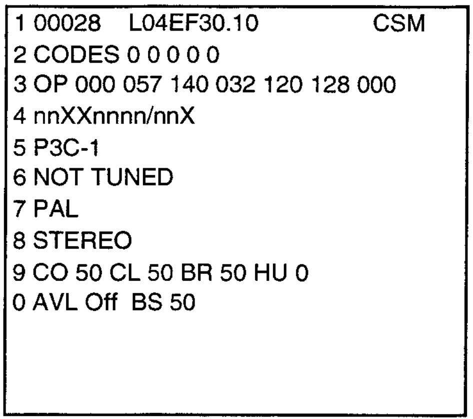
Purpose

The Customer Service Mode shows error codes and information on the TV operation settings. The call centre can instruct the customer to enter CSM by telephone and read off the information displayed. This helps the call centre to diagnose problems and failures in the TV set before making a service call.
The CSM is a read-only mode; therefore, modifications are not possible in this mode.

How to enter

To enter CSM, press the following key sequence on the remote control transmitter: '**1 2 3 6 5 4**' (do not allow the display to time out between entries while keying the sequence).

Upon entering the Customer Service Mode, the following screen will appear:



```
1 00028   L04EF30.10          CSM
2 CODES 0 0 0 0 0
3 OP 000 057 140 032 120 128 000
4 nnXXnnnn/nnX
5 P3C-1
6 NOT TUNED
7 PAL
8 STEREO
9 CO 50 CL 50 BR 50 HU 0
0 AVL Off  BS 50
```

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Figure 5-3 CSM menu

Menu explanation

1. Indication of the service mode (CSM = Customer Service Mode).
2. Reserved item.
3. Software identification of the main microprocessor (see 'Service Default Alignment Mode' for an explanation)
4. Reserved item for P3C call centres (AKBS stands for Advanced Knowledge Base System).
5. Indicates the type of TV system or whether or not the television is receiving an 'IDENT' signal on the selected source. If no 'IDENT' signal is detected, the display will read 'NOT TUNED'
6. Displays the last five errors detected in the error code buffer.

How to exit

To exit CSM, use one of the following methods:

- Press the MENU, STATUS/EXIT, or POWER button on the remote control transmitter.
- Press the POWER button on the television set.

5.3 Problems and Solving Tips Related to CSM

5.3.1 Picture Problems

Note: The problems described below are all related to the TV settings. The procedures used to change the value (or status) of the different settings are described.

Picture too dark or too bright

If:

- The picture improves when you have press the AUTO PICTURE button on the remote control transmitter, or
- The picture improves when you enter the Customer Service Mode

Then:

1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu (if necessary).
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys (if necessary) to select BRIGHTNESS.
6. Press the MENU LEFT/RIGHT keys to increase or decrease the BRIGHTNESS value.
7. Use the MENU UP/DOWN keys to select PICTURE.

8. Press the MENU LEFT/RIGHT keys to increase or decrease the PICTURE value.
9. Press the MENU button on the remote control transmitter twice to exit the user menu.
10. The new PERSONAL preference values are automatically stored.

White line around picture elements and text
If:
The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu (if necessary).
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select SHARPNESS.
6. Press the MENU LEFT key to decrease the SHARPNESS value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

Snowy picture
To enter CSM, press the following key sequence on the remote control transmitter: '**123654**' (do not allow the display to time out between entries while keying the sequence).

Check CSM line 5. If this line reads 'Not Tuned,' check the following:
- Antenna not connected. Connect the antenna.
- No antenna signal or bad antenna signal. Connect a proper antenna signal.
- The tuner is faulty (in this case line 6, the Error Buffer line, will contain error number 10). Check the tuner and replace/repair the tuner if necessary.

Black and white picture
If:
- The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu (if necessary).
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select COLOR.
6. Press the MENU RIGHT key to increase the COLOR value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

Menu text not sharp enough
If:
- The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter.

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu (if necessary).
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select PICTURE.
6. Press the MENU LEFT key to decrease the PICTURE value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

5.4 ComPair

5.4.1 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the European DST (service remote control), which allows faster and more accurate diagnostics. ComPair has three big advantages:
- ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
- ComPair allows very detailed diagnostics (on I2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C commands yourself because ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

5.4.2 Specifications

ComPair consists of a Windows based faultfinding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable.
In this chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector.

The ComPair faultfinding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in two ways:
- **Automatic** (by communication with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I2C level. ComPair can access the I2C bus of the television. ComPair can send and receive I2C commands to the micro controller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I2C busses of the TV-set.
- **Manually** (by asking questions to you): Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions (e.g. *Does the screen give a picture? Click on the correct answer: YES/*

NO) and showing you examples (e.g. *Measure test-point I7 and click on the correct waveform you see on the oscilloscope*). You can answer by clicking on a link (e.g. text or a waveform picture) that will bring you to the next step in the faultfinding process.

By a combination of automatic diagnostics and an interactive question / answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Beside fault finding, ComPair provides some **additional features** like:

- Up- or downloading of pre-sets.
- Managing of pre-set lists.
- Emulation of the Dealer Service Tool (DST).
- If both ComPair and SearchMan (Electronic Service Manual) are installed, all the schematics and the PWBs of the set are available by clicking on the appropriate hyperlink. **Example**: *Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Mono-carrier.*
  - Click on the 'Panel' hyperlink to automatically show the PWB with a highlighted capacitor C2568.
  - Click on the 'Schematic' hyperlink to automatically show the position of the highlighted capacitor.

5.4.3 How To Connect ComPair

1. First, install the ComPair Browser software (see the Quick Reference Card for installation instructions).
2. Connect the RS232 interface cable between a free serial (COM) port of your PC and the PC connector (marked with 'PC') of the ComPair interface.
3. Connect the mains adapter to the supply connector (marked with 'POWER 9V DC') of the ComPair interface.
4. Switch the ComPair interface "off".
5. Switch the television set "off" with the mains switch.
6. Connect the ComPair interface cable between the connector on the rear side of the ComPair interface (marked with 'I2C') and the ComPair (or *Service*) connector at the rear side of the TV (for its location see figure 8-1 in chapter "Alignments").
7. Plug the mains adapter in a mains outlet, and switch the interface "on". The green and red LEDs light up together. The red LED extinguishes after approx. 1 second while the green LED remains lit.
8. Start the ComPair program and read the 'Introduction' chapter.

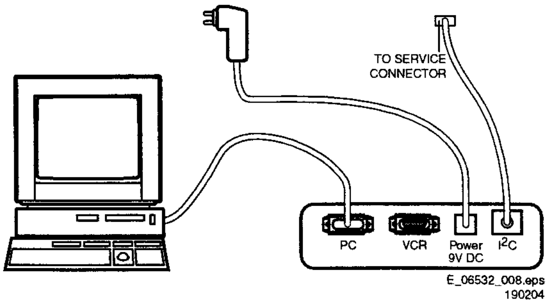


Figure 5-4 ComPair connection

5.4.4 How To Order

ComPair order codes:

- Starter kit ComPair32/SearchMan32 software and ComPair interface (excl. transformer): 3122 785 90450.
- ComPair interface (excluding transformer): 4822 727 21631.
- Starter kit ComPair32 software (registration version): 3122 785 60040.
- Starter kit SearchMan32 software: 3122 785 60050.
- ComPair32 CD (update): 3122 785 60070 (year 2002, 3122 785 60110 (year 2003).
- SearchMan32 CD (update): 3122 785 60080 (year 2002), 3122 785 60120 (year 2003).
- ComPair interface cable: 3122 785 90004.
- Transformer (non-UK): 4822 727 21632.
- Transformer UK: 4822 727 21633.

Note: If you encounter any problems, contact your local support desk.

5.5 Error Codes

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.

5.5.1 How To Read The Error Buffer

You can read the error buffer in 3 ways:

- On screen via the SDAM (if you have a picture).
  Examples:
  - ERROR: 0 0 0 0 0 : No errors detected
  - ERROR: 6 0 0 0 0 : Error code 6 is the last and only detected error
  - ERROR: 9 6 0 0 0 : Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See 'The Blinking LED Procedure'.
- Via ComPair.

5.5.2 How To Clear The Error Buffer

The error code buffer is cleared in the following cases:

- By using the CLEAR command in the SDAM menu:
  - To enter SAM, press the following key sequence on the remote control transmitter: '062596' directly followed by the "OSD" icon button (do not allow the display to time out between entries while keying the sequence).
  - Make sure the menu item CLEAR is highlighted. Use the MENU UP/DOWN buttons, if necessary.
  - Press the MENU RIGHT button to clear the error buffer. The text on the right side of the 'CLEAR' line will change from 'CLEAR?' to 'CLEARED'
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the Mains from the television set, the error buffer is not reset.

5.5.3 Error Codes

In case of non-intermittent faults, write down the errors present in the error buffer and clear the error buffer before you begin the repair. This ensures that old error codes are no longer present.

If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error and not the actual cause of the problem (for example, a fault in the protection detection circuitry can also lead to a protection).

Table 5-3 Error codes overview

Error	Device	Error description	Check item	Diagram
0	Not applicable	No Error		
1	Not applicable	X-Ray / over-voltage protection (US only)	2411, 2412, 2413, 6404, 6411, 6412.	A2
2	Not applicable	High beam (BCI) protection	3404, 7405	A2
3	Not applicable	Vertical guard protection	3466, 7451, 7452, 7453, 7454	A2
4	Tuner UA1316/A	I2C error while communicating with 2nd tuner	1000, 5010 (PIP Module)	F2
5	Not applicable	+5v protection	7604, 7605	A5
6	I2C bus	General I2C error	7200, 3207, 3214	A4
7	Not applicable	-	-	-
8	Not applicable	-	-	-
9	24C16	I2C error while communicating with the EEPROM	7601, 3604, 3605	A5
10	Tuner	= I2C error while communicating with the PLL tuner	1000, 5001	A3
11	TDA6107/A	Black current loop instability protection	7330, 3351, CRT	B1
12	SDA9488X	I2C error while communicating with the PIP processor	7242 (PIP Module)	F1
13	Not applicable	-	-	-
14	DVD Loader	I2C error while communicating with the DVD Interface module	DVD Interface module	DVD Loader
15	TDA9178T/N1	I2C error while communicating with LTI module	7610	H
16	TDA9887	I2C error while communicating with PIP_Demodulator	7201	F2
17	Not applicable	-	-	-
18	Not applicable	-	-	-
19	TDA1200	I2C error while communicating with SSD stereo sound decoder	7200	A4
20	TDA1200	I2C error while communicating with video cosmic in Hercules IC	7200	A4

Note: Errors 7, 8, 13, 17, 18 are not applicable.

5.6 The Blinking LED Procedure

Using this procedure, you can make the contents of the error buffer visible via the front LED. This is especially useful when there is no picture.

When the SDM is entered, the LED will blink the contents of the error-buffer:

- When all the error-codes are displayed, the sequence finishes with an 'on' LED blink of 1.5 seconds,
- The sequence starts again.

Example of error buffer: **12 9 6 0 0**
After entering SDM, the following occurs:

- 1 long 'on' blink of 5 seconds to start the sequence,
- 12 short blinks followed by a pause of 1.5 seconds,
- 9 short blinks followed by a pause of 1.5 seconds,
- 6 short blinks followed by a pause of 1.5 seconds,
- 1 long 'on' blink of 1.5 seconds to finish the sequence,
- The sequence starts again at 12 short blinks.

5.7 Protections

If a fault situation is detected, an error code will be generated; and, if necessary, the television set will go into protection mode. Blinking of the red LED at a frequency of 3 Hz indicates the protection mode. In some error cases, the microprocessor does not put the set in protection mode. The error codes of the error buffer and the blinking LED procedure can be read via the Service Default Menu (SDM), or via ComPair.
To get a quick diagnosis the chassis has three service modes implemented:

- The Customer Service Mode (CSM).
- The Service Default Mode (SDM).
- The Service Alignment Mode (SAM).

For a detailed description, see the "Customer Service Mode, Service Default mode" and "Service Alignment Mode" sections.

5.8 Fault Finding and Repair Tips

Notes:

- It is assumed that the components are mounted correctly with correct values and no bad solder joints.
- Before any fault finding actions, check if the correct options are set.

5.8.1 NVM Editor

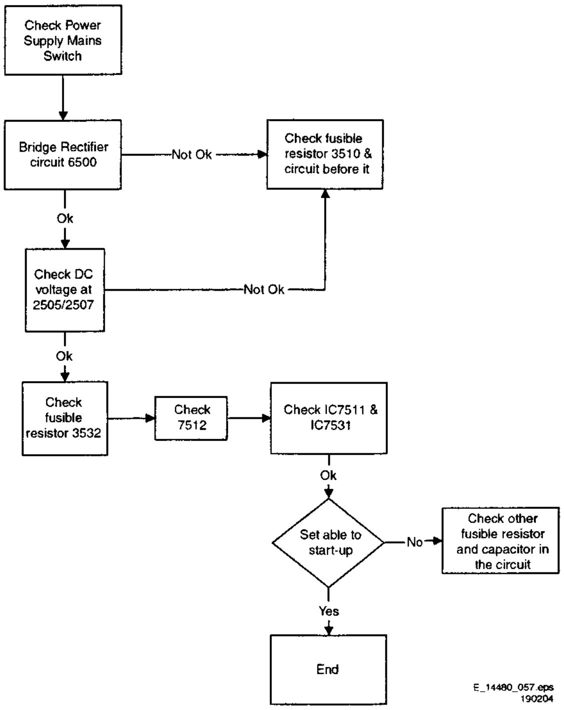
In some cases, it can be handy if one directly can change the NVM contents. This can be done with the "NVM Editor" in SAM mode. In the next table, the default NVM values are given.

Table 5-4 NVM default values

	Address (dec)	Value (hex)
EW (EW width)	19	25
PW (EW parabola width)	20	0A
HS (Horizontal shift)	21	1A
HP (Horizontal parallelogram)	22	1F
HB (Horizontal Bow)	23	1F
UCP (EW upper corner parabola)	24	1E
LCP (EW lower corner parabola)	25	28
TC (EW trapezium)	26	1A
VS (Vertical slope)	27	25
VA (Vertical amplitude)	28	1E
SC (S-Correction)	29	1C
VSH (Vertical Shift)	30	1A
VX (Vertical Zoom)	31	19
VSL (Vertical scroll)	32	20
VL (Vertical linearity)	33	20
AGC (AGC Takeover)	36	1E
OIF (IF-PLL Offset)	37	20
AGC10 (AGC 10)	38	1
H60 (60 Hz Horizontal Shift)	39	9
PF_SC_PWL (Peaking Frequency, Soft Clipper, Peak White Limit)	40	0A
COR (Phase 1 time constant, Video Dependant Coring, Ratio & White stretch)	41	0F
60 Hz Vertical amplitude	42	40
YD & CL	43	2
RGB amplitude for full teletext mode	46	0C
NVM_TABLE_VERSION	60	26
OPTION_TABLE_VERSION	61	11
CVI_BLOR	62	1E
CVI_BLOG	63	1C
TXT Brightness	64	0F
V60 offset (60Hz Vertical Amplitude)	66	FE
FOAB, CHSE	139	3
SPR, WS	140	0
VMA, SVM	141	31
NVM_SOC_SMD	142	33
CCC_Preset_Gain_Red	143	1F
CCC_Preset_Gain_Green	144	1F
CCC_Preset_Gain_Blue	145	1F
NVM_FMWS	149	2
NVM_ASD_SC1_THR	150	10
NVM_CRYSTAL_ALIGN	208	4F
Last Brightness (VID PP others)	264	34
Last Color (VID PP others)	265	2C
Last Contrast (VID PP others)	266	4B
Last Sharpness (VID PP others)	267	37
Last Hue (VID PP others)	268	32
Last Colour Temperature (VID PP others)	269	0D
White-D Cool Red	294	FD
White-D Cool Blue	296	8
White-D Normal Red	297	22
White-D Normal Green	298	20
White-D Normal Blue	299	1B
White-D Warm Red	300	2
White-D Warm Blue	302	FA
Last Volume	343	19
Last Balance	344	32
Last Treble (AUD PP others)	345	32
Last Bass (AUD PP others)	346	32

5.8.2 Power Supply

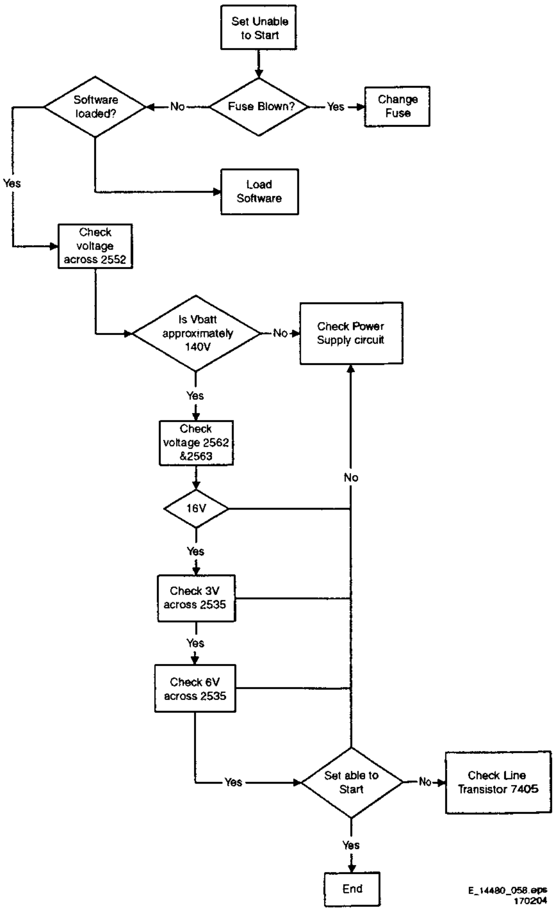
Set Not Working



Check Power Supply Mains Switch
Bridge Rectifier circuit 6500
Not Ok
Check fusible resistor 3510 & circuit before it
Ok
Check DC voltage at 2505/2507
Not Ok
Ok
Check fusible resistor 3532
Check 7512
Check IC7511 & IC7531
Ok
Set able to start-up
No
Check other fusible resistor and capacitor in the circuit
Yes
End
E_14480_057.eps
190204

Figure 5-5 Fault finding tree "Set not working"

Set Does Not Start Up



Set Unable to Start
Software loaded?
No
Fuse Blown?
Yes
Change Fuse
Yes
Load Software
Check voltage across 2552
Is Vbatt approximately 140V
No
Check Power Supply circuit
Yes
Check voltage 2562 &2563
No
16V
Yes
Check 3V across 2535
Yes
Check 6V across 2535
Yes
Set able to Start
No
Check Line Transistor 7405
Yes
End
E_14480_058.eps
170204

Figure 5-6 Fault finding tree "Set does not start up"

5.8.3 Deflection

One Thin Vertical Line

Quick check:

- Set in protection mode.
- LED blinking with error "3".

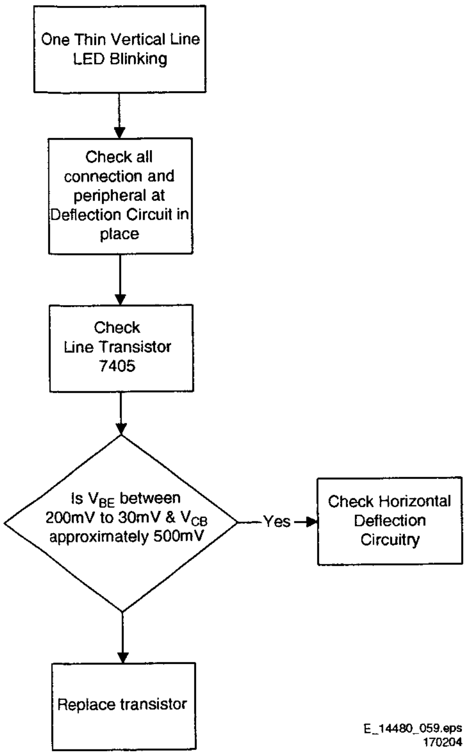

One Thin Vertical Line LED Blinking
Check all connection and peripheral at Deflection Circuit in place
Check Line Transistor 7405
Is V_BE between 200mV to 30mV & V_CB approximately 500mV
Yes
Check Horizontal Deflection Circuitry
Replace transistor
E_14480_059.eps
170204

Figure 5-7 Fault finding tree "One thin vertical line"

One Thin Horizontal Line

Quick check:

- Set in protection mode.
- LED blinking with error "2".

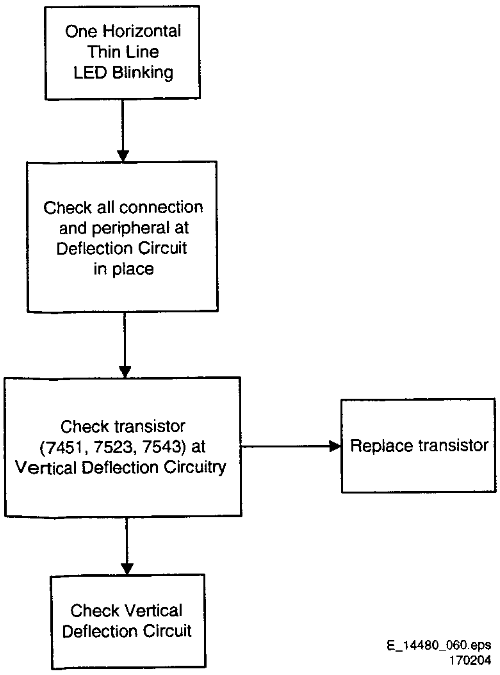

One Horizontal Thin Line LED Blinking
Check all connection and peripheral at Deflection Circuit in place
Check transistor (7451, 7523, 7543) at Vertical Deflection Circuitry
Replace transistor
Check Vertical Deflection Circuit
E_14480_060.eps
170204

Figure 5-8 Fault finding tree "One thin horizontal line"

Blank Screen

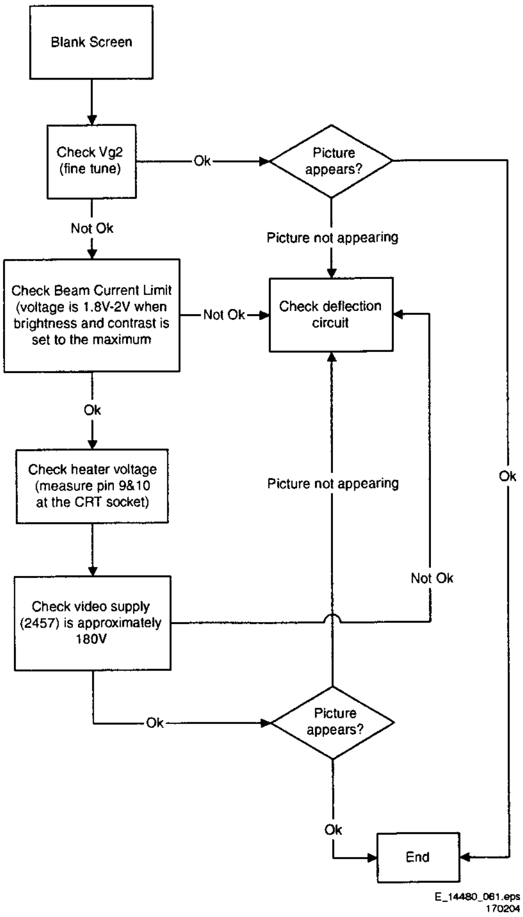

Blank Screen
Check Vg2 (fine tune)
Ok
Picture appears?
Not Ok
Picture not appearing
Check Beam Current Limit (voltage is 1.8V-2V when brightness and contrast is set to the maximum
Not Ok
Check deflection circuit
Ok
Check heater voltage (measure pin 9&10 at the CRT socket)
Picture not appearing
Ok
Not Ok
Check video supply (2457) is approximately 180V
Ok
Picture appears?
Ok
End
E_14480_061.eps
170204

Figure 5-9 Fault finding tree "Blank screen"

5.8.4 Source Selection

Set is not able to go into AV or any missing AV is encountered

E.g. AV1 is available but not able to enter to AV1: Check if the option setting is correct.

Set is able to go to AV, but no audio is heard.

1. Check that continuity of signal is there from the SCART/ Cinch input to the input of the Hercules.
2. If continuity is there and still no audio, check that option settings are correct.
3. If logic setting is correct and still no audio, proceed to Audio Decoder/Processor troubleshooting section.

Set is able to go into AV but no video is available:

1. Check continuity from AV input to HERCULES depending on the input.
2. If continuity is available and yet no video, proceed to Video Processor troubleshooting section.

5.8.5 Tuner and IF

No Picture

1. Check that the Option settings are correct.
2. If correct, check that supply voltages are there.
3. If supply voltages are present, check whether picture is present in AV.
4. If picture is present in AV, check with the scope the Tuner IF output signal by manual storage to a known channel.

5. If IF output is present, Tuner is working fine. If no IF output, I2C data lines may be open, check continuity of I2C lines. If I2C lines are ok, Tuner may be defect, replaced Tuner.
6. If Tuner IF is present and yet still no picture in RF mode, go to Video Processing troubleshooting section.

No Picture, No Sound

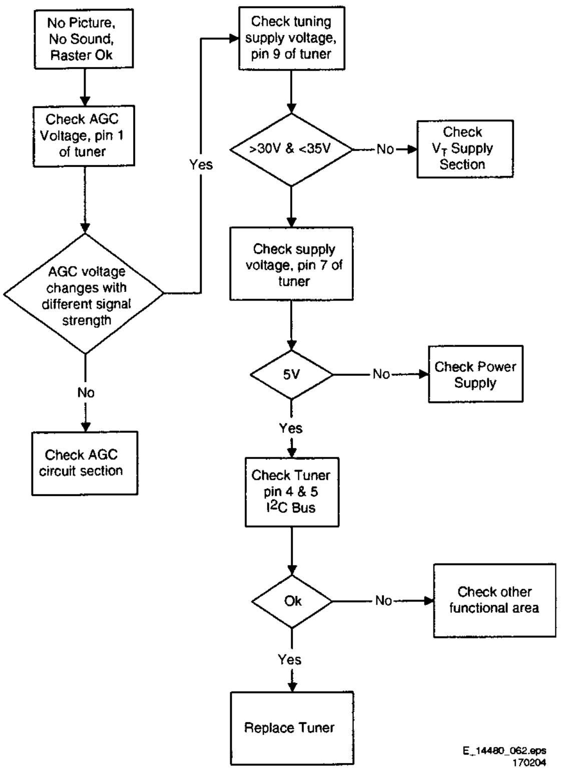

No Picture, No Sound, Raster Ok
Check AGC Voltage, pin 1 of tuner
AGC voltage changes with different signal strength
Yes
No
Check AGC circuit section
Check tuning supply voltage, pin 9 of tuner
>30V & <35V
No
Check V_T Supply Section
Check supply voltage, pin 7 of tuner
5V
No
Check Power Supply
Yes
Check Tuner pin 4 & 5 I²C Bus
Ok
No
Check other functional area
Yes
Replace Tuner
E_14480_062.eps 170204

Figure 5-10 Fault finding tree "No picture, no sound"

Picture Ok, No Sound

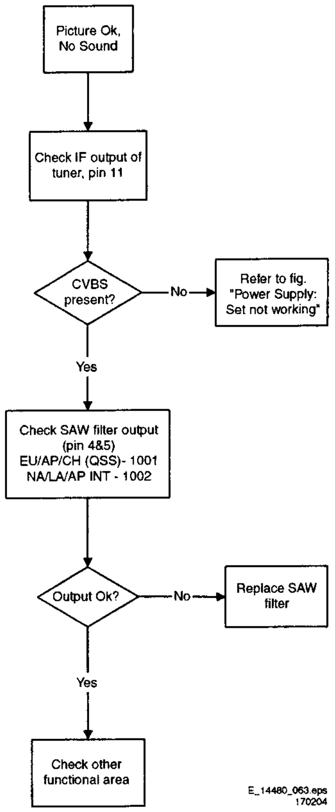

Picture Ok, No Sound
Check IF output of tuner, pin 11
CVBS present?
No
Refer to fig. "Power Supply: Set not working"
Yes
Check SAW filter output (pin 4&5) EU/AP/CH (QSS)- 1001 NA/LA/AP INT - 1002
Output Ok?
No
Replace SAW filter
Yes
Check other functional area
E_14480_063.eps 170204

Figure 5-11 Fault finding tree "Picture ok, no sound"

Unable To Perform Tuning

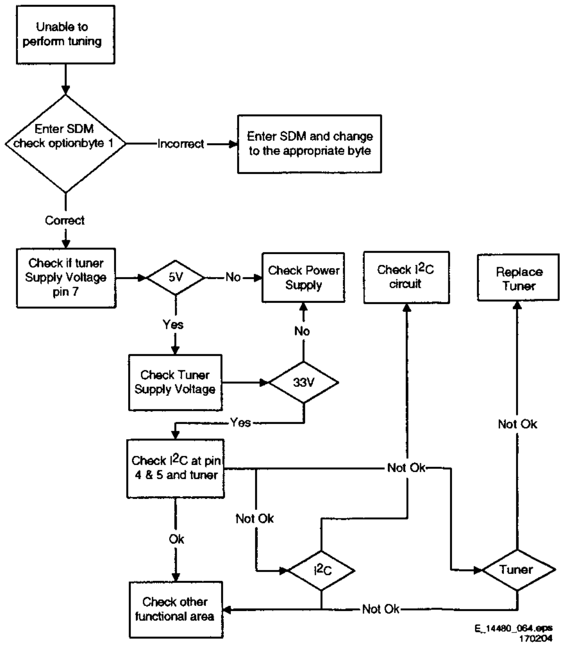

Unable to perform tuning
Enter SDM check optionbyte 1
Incorrect
Enter SDM and change to the appropriate byte
Correct
Check if tuner Supply Voltage pin 7
5V
No
Check Power Supply
Yes
No
Check Tuner Supply Voltage
33V
Yes
Check I²C circuit
Replace Tuner
Check I²C at pin 4 & 5 and tuner
Not Ok
Not Ok
Not Ok
Ok
I²C
Tuner
Check other functional area
Not Ok
E_14480_064.eps 170204

Figure 5-12 Fault finding tree "Unable to perform tuning"

5.8.6 Controller

Below are some guidelines for troubleshooting of the Micro Controller function. Normally Micro Controller should be checked when there is a problem of startup.

1. Check that both +3.3 V_dc and +1.8 V_dc are present.
2. Check that crystal oscillator is working.

3. Check that Power Good signal is at "high" logic, normal operation.
4. Check that HERCULES is not in standby mode. Pin 15 of HERCULES should be 0 V_dc.
5. Make sure H-drive pulse is there. This can be checked at resistor R3239. If H-drive does not exist, remove resistor R3239 to check if there is loading.

Note: When the set shuts down after a few second after power "on", the main cause is that Vg2 not aligned properly, try adjusting Vg2 during the few seconds of power "on".

5.8.7 Video Processing

No Picture

When "no picture in RF", first check if the microprocessor is functioning ok in section "Controller". If that is ok, follow the next steps.
When "no picture in AV", first check if the video source selection is functioning ok in section "Source Selection". If that is ok, follow the next steps.

1. Check that normal operating conditions are met.
2. Check that there is video signal at pin 81. If no video, demodulator part of the HERCULES is faulty, replace with new HERCULES.
3. If video signal is available at pin 81, check pin 56, 57, and 58 for the RGB signal.
4. If signal is not available, try checking the BRIGHTNESS and/or CONTRAST control, and make sure it is not at zero.
5. If still with the correct settings and no video is available, proceed to the CRT/RGB amplifier diagram.

For sets with TDA9178, follow steps below:

1. Put Option Byte 2 bit 4 to "0"; if video signal is not available, then check fault finding section "Controller", Section "Source Selection", and steps above.
2. If video is available but not correct, put Option Byte 2 bit 4 to "1", then check if LTI panel is present. If not, put LTI panel in the main chassis (connector 1221).
3. If LTI panel is in main chassis, check cable between LTI panel and main chassis (position is 1206). If it is connected, then the LTI panel is faulty, replace it.

For sets with Scavem, and Scavem does not work, follow steps below:

1. Check Scavem coil connector (position is 1361) if connected; if not, connect it.
2. If connected, check NVM "bit storage" byte 1 bit 7; if it is not "1", set it to "1".
3. If it is "1", then check the data of the NVM addresses as in the next table. If the data is not correct, then set these addresses to diagram values.
4. If it still not works, track Scavem output from pin64 of HERCULES to CRT panel.

Table 5-5 NVM default values for Scavem

Description	Address (dec)	Address (hex)	Value (hex)
SPR, WS	140	8C	00
VMA, SVM	141	8D	31
NVM_SOC_SMD	142	8E	33

5.8.8 Audio Processing

No Sound

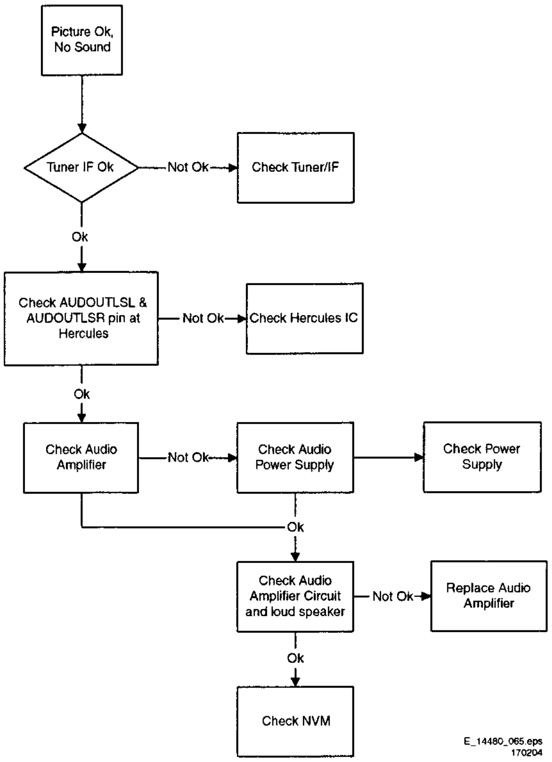


Figure 5-13 Fault finding tree "No sound"

No RF audio for QSS/Inter-Carrier stereo sets.

1. Check pin 99 and 100 for SIF signal (for QSS) or pin 104 and 105 for video with SIF (for Inter-Carrier)
2. If signal is not present, check for the QSS/FMI bit settings. Check also the NVM data.
3. If signals are present and still no audio, check the audio supply voltage +8V are present.
4. If still no audio signal at Hercules output, Hercules is faulty.

No AV audio.

1. Check troubleshooting methods in section "Source Selection".
2. Check the output of the Hercules to see if there is signal available. If no, check the normal operating condition and also the NVM data.
3. If still no audio signal at Hercules output, Hercules is faulty.

Note: If there is audio signal at Hercules output and no audio at loudspeaker, proceed to Audio Amplifier troubleshooting methods.

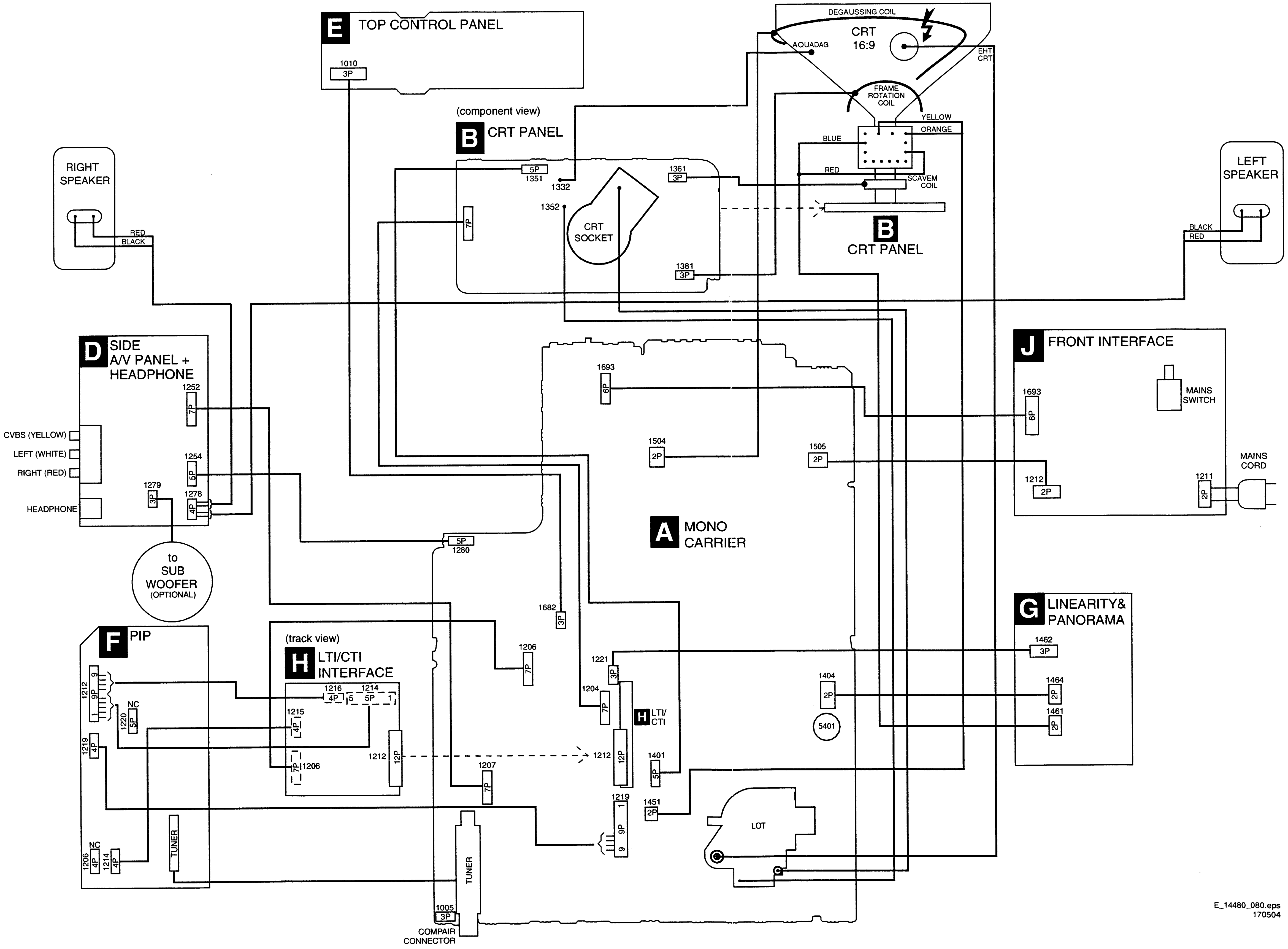
5.8.9 Audio Amplifier

No RF as well as AV audio at the loudspeaker:

1. Check that the normal operation condition of the amplifier is met.
2. If normal operation conditions are met, check the continuity from Hercules output to input of the amplifier.
3. If continuity is there and still no audio, check speaker wire connections. If still no audio, amplifier IC might be faulty.

6. Block Diagrams, Testpoint Overviews, and Waveforms

Wiring Diagram

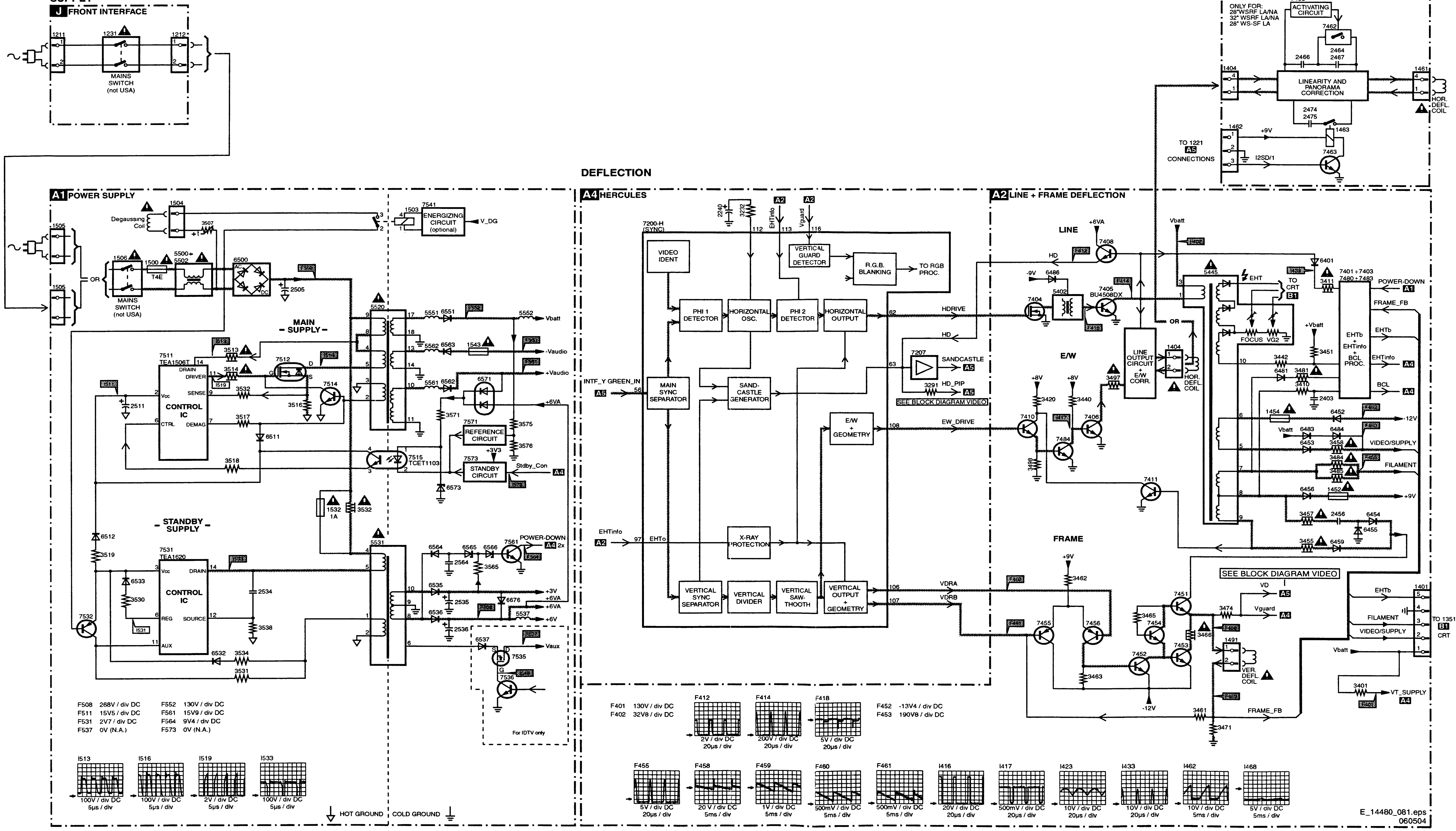

E TOP CONTROL PANEL
1010 3P
DEGAUSSING COIL
CRT 16:9
AQUADAG
EHT CRT
FRAME ROTATION COIL
YELLOW
ORANGE
BLUE
RED
SCAVEM COIL
B CRT PANEL
(component view)
B CRT PANEL
5P 1351
1332
1361 3P
1352
CRT SOCKET
7P
1381 3P
RIGHT SPEAKER
RED
BLACK
LEFT SPEAKER
BLACK
RED
D SIDE A/V PANEL + HEADPHONE
1252 7P
CVBS (YELLOW)
LEFT (WHITE)
RIGHT (RED)
1254 5P
1279 3P
1278 4P
HEADPHONE
to SUB WOOFER (OPTIONAL)
5P 1280
1693 6P
1504 2P
1505 2P
A MONO CARRIER
J FRONT INTERFACE
1693 6P
MAINS SWITCH
1212 2P
1211 2P
MAINS CORD
G LINEARITY& PANORAMA
1462 3P
1464 2P
1461 2P
1682 3P
1206 7P
1221 3P
1204 7P
H LTI/ CTI
1212 12P
1401 5P
1404 2P
5401
1219 1 9P 9
1451 2P
LOT
F PIP
1212 9P 9 1
NC
1220 5P
1219 4P
NC
1206 4P
1214 4P
TUNER
(track view)
H LTI/CTI INTERFACE
1216 4P
1214 5 5P 1
1215 4P
7P 1206
1212 12P
1207 7P
TUNER
1005 3P
COMPAIR CONNECTOR

E_14480_080.eps
170504

Block Diagram Supply and Deflection

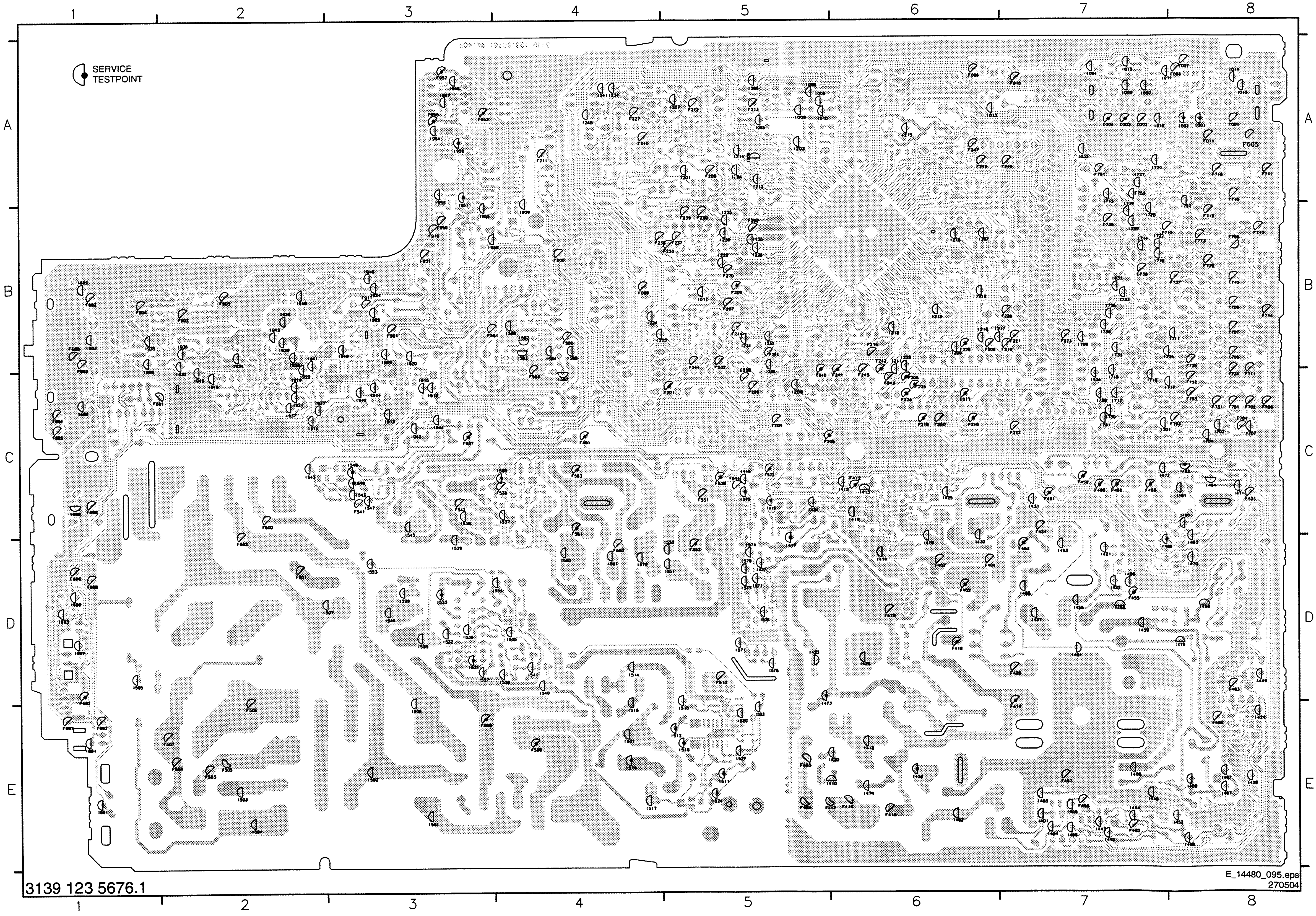
SUPPLY AND DEFLECTION

SUPPLY

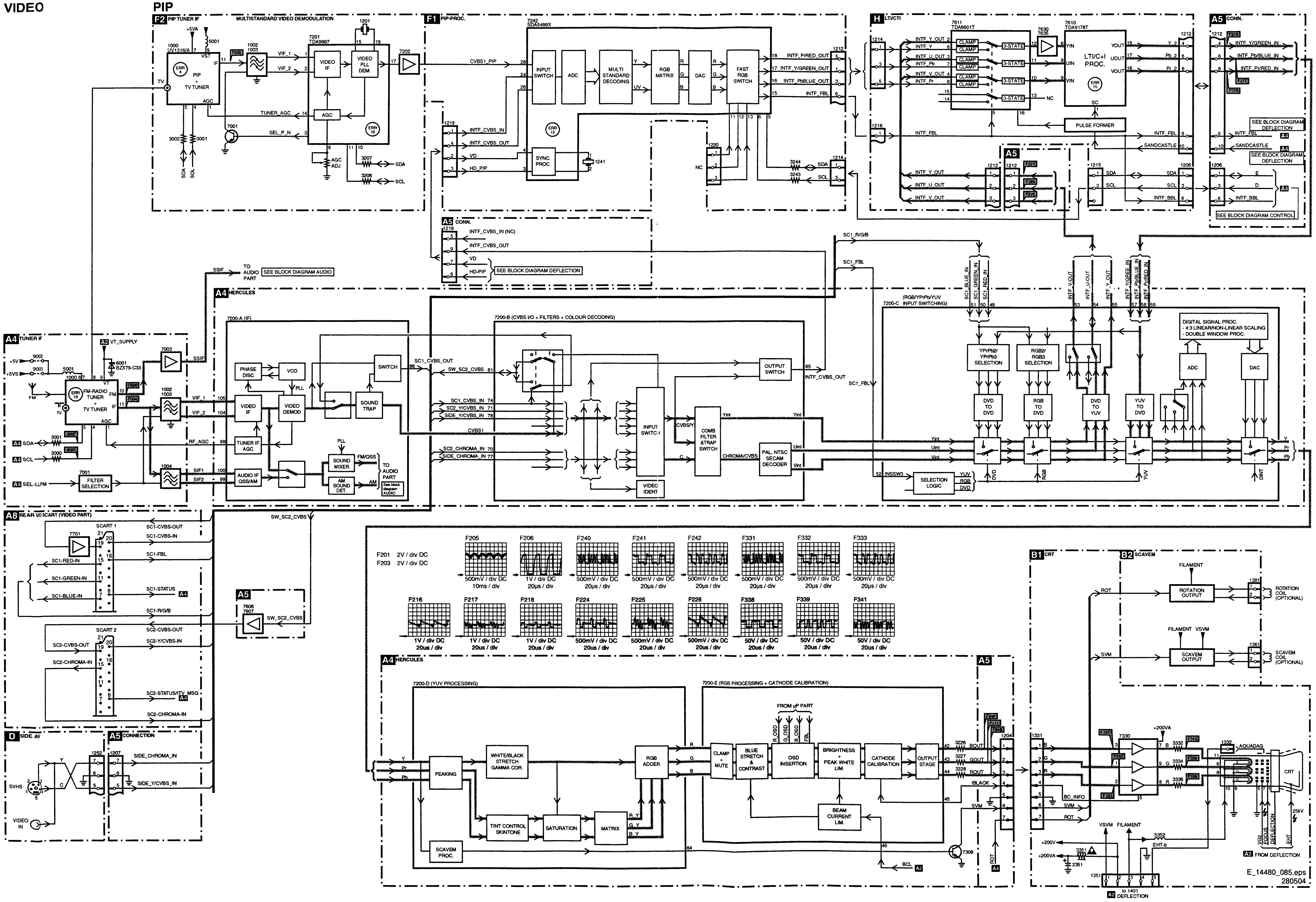

J FRONT INTERFACE
1211
1231
1212
MAINS SWITCH (not USA)
A1 POWER SUPPLY
Degaussing Coil
1504
3507
1505
1506
1500
T4E
5500
5502
6500
2505
OR
MAINS SWITCH (not USA)
1503
7541
ENERGIZING CIRCUIT (optional)
V_DG
5520
MAIN - SUPPLY -
5551
6551
5552
Vbatt
5562
6563
1543
-Vaudio
+Vaudio
5561
6562
6571
+6VA
3571
7571
REFERENCE CIRCUIT
3575
3576
+3V3
7573
STANDBY CIRCUIT
Stdby_Con
A4
6573
7511
TEA1506T
DRAIN
DRIVER
SENSE
CONTROL IC
Vcc
CTRL
DEMAG
3513
3514
I519
3532
3516
7512
7514
2511
3517
6511
3518
7515
TCET1103
1532
1A
3532
5531
6564
6565
6566
2564
3565
7561
POWER-DOWN
A4 2x
6535
2535
6676
+3V
+6VA
5537
+6V
6536
2536
6537
7535
Vaux
7536
For IDTV only
- STANDBY - SUPPLY
6512
3519
7531
TEA1620
Vcc
DRAIN
CONTROL IC
REG
SOURCE
AUX
6533
3530
I531
2534
3538
7532
6532
3534
3531
F508 268V / div DC
F511 15V5 / div DC
F531 2V7 / div DC
F537 0V (N.A.)
F552 130V / div DC
F561 15V9 / div DC
F564 9V4 / div DC
F573 0V (N.A.)
I513
I516
I519
I533
100V / div DC 5µs / div
100V / div DC 5µs / div
2V / div DC 5µs / div
100V / div DC 5µs / div
HOT GROUND
COLD GROUND
DEFLECTION
A4 HERCULES
2240
3232
A2
A2
EHTinfo
Vguard
112
113
116
7200-H (SYNC)
VIDEO IDENT
VERTICAL GUARD DETECTOR
R.G.B. BLANKING
TO RGB PROC.
PHI 1 DETECTOR
HORIZONTAL OSC.
PHI 2 DETECTOR
HORIZONTAL OUTPUT
62
HDRIVE
HD
7207
SANDCASTLE
A5
3291
HD_PIP
SEE BLOCK DIAGRAM VIDEO
63
INTF_Y GREEN_IN
A5
56
MAIN SYNC SEPARATOR
SAND-CASTLE GENERATOR
E/W + GEOMETRY
108
EW_DRIVE
EHTinfo
A2
97
EHTo
X-RAY PROTECTION
VERTICAL SYNC SEPARATOR
VERTICAL DIVIDER
VERTICAL SAW-TOOTH
VERTICAL OUTPUT + GEOMETRY
106
107
VDRA
VDRB
F401 130V / div DC
F402 32V8 / div DC
F412
F414
F418
2V / div DC 20µs / div
200V / div DC 20µs / div
5V / div DC 20µs / div
F452 -13V4 / div DC
F453 190V8 / div DC
A2 LINE + FRAME DEFLECTION
LINE
+6VA
Vbatt
7408
HD
-9V
6486
7404
5402
7405
BU4508DX
5445
EHT
TO CRT B1
6401
7401÷7403
7480÷7483
3411
POWER-DOWN
A1
FRAME_FB
FOCUS
VG2
OR
LINE OUTPUT CIRCUIT + E/W CORR.
1404
HOR. DEFL. COIL
E/W
+8V
+8V
3420
3440
3497
7410
7406
7484
3498
+Vbatt
3451
3442
6481
3481
3410
2403
EHTb + EHTinfo + BCL PROC.
EHTb
EHTinfo
BCL
A4
A4
1454
6452
-12V
Vbatt
6483
6484
6453
3458
VIDEO/SUPPLY
3484
FILAMENT
3485
7411
6456
1452
+9V
3457
2456
6454
6455
3455
6459
FRAME
+9V
3462
SEE BLOCK DIAGRAM VIDEO
VD
A5
7451
3474
Vguard
A4
3465
7454
7455
7456
3466
1491
7453
7452
VER. DEFL. COIL
3463
-12V
3461
3471
FRAME_FB
EHTb
1401
FILAMENT
VIDEO/SUPPLY
TO 1351 B1 CRT
Vbatt
3401
VT_SUPPLY
A4
G LINEARITY & PANORAMA
ONLY FOR: 28"WSRF LA/NA 32" WSRF LA/NA 28" WS-SF LA
7460
ACTIVATING CIRCUIT
7462
2466
2464
2467
LINEARITY AND PANORAMA CORRECTION
1461
HOR. DEFL. COIL
2474
2475
1463
1462
+9V
TO 1221 A5 CONNECTIONS
I2SD/1
7463
F455
F458
F459
F460
F461
I416
I417
I423
I433
I462
I468
5V / div DC 20µs / div
20 V / div DC 5ms / div
1V / div DC 5ms / div
500mV / div DC 5ms / div
500mV / div DC 5ms / div
20V / div DC 20µs / div
500mV / div DC 20µs / div
10V / div DC 20µs / div
10V / div DC 20µs / div
10V / div DC 5ms / div
5V / div DC 5ms / div
E_14480_081.eps 060504

Testpoint Overview Mono Carrier

F001	A8
F002	A7
F003	A7
F004	A7
F005	A8
F006	A6
F007	A8
F008	A8
F009	B4
F010	A7
F011	A8
F200	B4
F201	C5
F202	B5
F203	B5
F204	C5
F205	C5
F206	C6
F207	B5
F208	B6
F209	A5
F210	A4
F211	A4
F212	A5
F213	A5
F214	B5
F215	B6
F216	C6
F217	C6
F218	C6
F219	B7
F220	B7
F221	B7
F222	C7
F223	B7
F224	C6
F225	C6
F226	B6
F227	A4
F228	C5
F229	C5
F230	B5
F232	B5
F233	B5
F237	B5
F238	B4
F239	B5
F240	C5
F241	C6
F242	B6
F243	C6
F244	B5
F245	C6
F247	A6
F248	A6
F249	A7
F250	C6
F251	B5
F270	B5
F401	C4
F402	D6
F404	D6
F407	D6
F412	C6
F414	E7
F415	E6
F416	E6
F417	E5
F418	D6
F419	D6
F420	D7
F451	C8
F452	C7
F453	D7
F454	C7
F455	D7
F456	E7
F457	E7
F458	C7
F459	C7
F460	C7
F461	C7
F462	E7
F463	D8
F464	E5
F465	E5
F466	E8
F500	C2
F501	D2
F502	D2
F503	E2
F504	E2
F505	E2
F506	E2
F507	E2
F508	E3
F509	E4
F510	D5
F535	C4
F536	C5
F537	C3
F541	C3
F542	C3
F551	C5
F552	D5
F561	C4
F562	D4
F563	C4
F564	C5
F573	C5
F581	B3
F582	B4
F583	C4
F682	B1
F683	B1
F685	B1
F691	C1
F692	D1
F693	E1
F694	C1
F695	C1
F696	D1
F697	E1
F698	C1
F699	D1
F701	C8
F702	C8
F703	C8
F704	C8
F705	B8
F706	C8
F707	B8
F708	B8
F709	B8
F710	B8
F711	C8
F712	B8
F713	B8
F714	B8
F715	B7
F716	A8
F717	A8
F718	A8
F719	B8
F731	C8
F732	C8
F733	C8
F734	C8
F735	B8
F736	B7
F737	B8
F738	B7
F739	B8
F751	A7
F752	A7
F901	B3
F903	B2
F904	B1
F905	B2
F910	B3
F911	B3
F950	B3
F951	B3
F952	A3
F953	A3
F955	A3
I001	A8
I002	A8
I003	A7
I004	A7
I005	A5
I006	A5
I007	A7
I008	A5
I009	A5
I010	A5
I011	A7
I012	A7
I013	A6
I014	A8
I015	A8
I016	A7
I017	B5
I201	A5
I203	A5
I204	A5
I205	A5
I206	A5
I207	B6
I208	C5
I209	B6
I210	B6
I211	B6
I212	B6
I213	A5
I214	A5
I215	A6
I216	B6
I217	B7
I218	B6
I219	B6
I222	B5
I223	B5
I224	B4
I225	B5
I226	B6
I227	A5
I228	B5
I229	C5
I230	B5
I231	B5
I232	A7
I233	B7
I234	A4
I235	B5
I236	B5
I240	A4
I241	A4
I401	E7
I402	E6
I403	E7
I404	E7
I405	E7
I406	E7
I407	E8
I409	E8
I410	E6
I412	E6
I413	C6
I414	D6
I415	C6
I416	C5
I417	D5
I418	D6
I419	C6
I421	D7
I422	D7
I423	D5
I424	E8
I425	C6
I426	D7
I427	D5
I428	D6
I429	E8
I430	E6
I431	C7
I432	D6
I433	E6
I434	C5
I443	E7
I444	E7
I445	E7
I446	C5
I448	E7
I449	D8
I451	D7
I452	E8
I453	D7
I455	D7
I456	D8
I457	D7
I458	D7
I459	D7
I460	C8
I461	C8
I462	C8
I463	D8
I464	C8
I465	E7
I466	D7
I467	E8
I468	D7
I469	E8
I470	D8
I471	C8
I472	C7
I473	E5
I474	E6
I475	D8
I501	E3
I502	E3
I503	E2
I504	E2
I505	D1
I506	E3
I507	D3
I511	E5
I513	E5
I514	D4
I515	E4
I516	E4
I517	E4
I518	E5
I519	E5
I520	E5
I521	E4
I523	E5
I524	E5
I527	E5
I529	D3
I531	D3
I532	D3
I533	D3
I535	D3
I536	D3
I537	C4
I538	C3
I539	D3
I540	D4
I541	D4
I542	C3
I543	C2
I544	D3
I545	C3
I546	C3
I547	C3
I548	C3
I551	D5
I552	D5
I553	D3
I554	D4
I555	D4
I556	D4
I557	D3
I561	D4
I562	D4
I565	C4
I571	D5
I572	C5
I573	D5
I574	D5
I575	D5
I576	D5
I577	D5
I578	D5
I579	D4
I582	B4
I583	B4
I584	B4
I585	B4
I587	C4
I588	B4
I681	E1
I682	B1
I683	B1
I686	C1
I687	D1
I688	C1
I689	D1
I691	E1
I693	D1
I701	C7
I702	C8
I704	C8
I705	B8
I707	C8
I709	B7
I710	B7
I711	B8
I713	A7
I714	B7
I715	C7
I716	C8
I717	C7
I718	C7
I719	B7
I720	A7
I721	B8
I722	B7
I727	A7
I728	B7
I729	C7
I730	C7
I731	C7
I732	B7
I733	B7
I734	C7
I735	B7
I736	B7
I739	B7
I909	B3
I910	C3
I911	C3
I913	C3
I914	C2
I915	C3
I916	C2
I918	C3
I919	C2
I920	B3
I921	C2
I922	C2
I924	B3
I925	B3
I926	B2
I927	C2
I928	B1
I930	C2
I934	B2
I935	B1
I936	B2
I937	C2
I938	B2
I939	B2
I940	B2
I941	B2
I942	C3
I943	B2
I944	C3
I945	C2
I946	B3
I948	B3
I951	B3
I952	A3
I953	A3
I954	A3
I955	B3
I956	A3
I957	A3
I958	B4
I959	B4

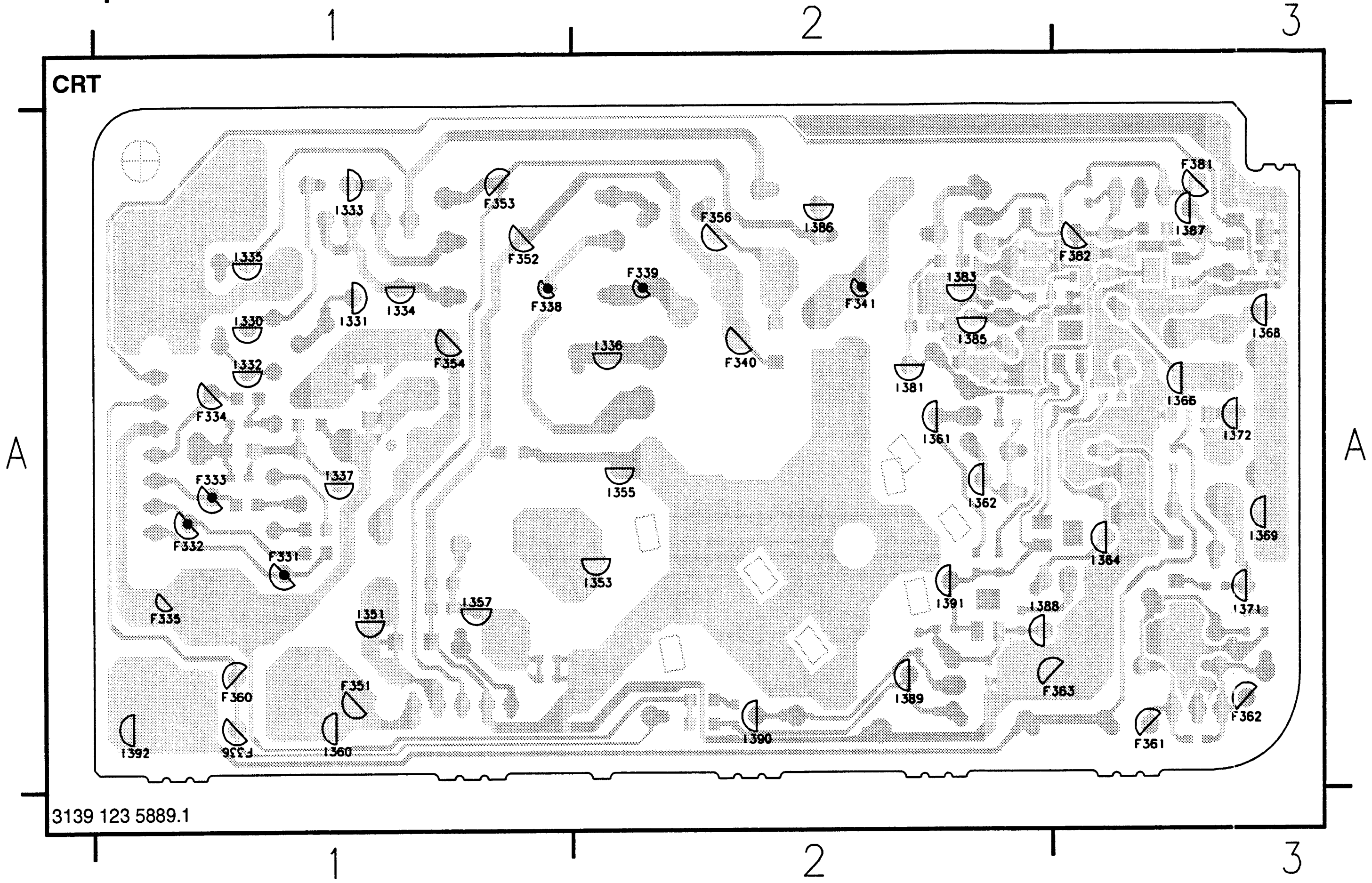


Block Diagram Video



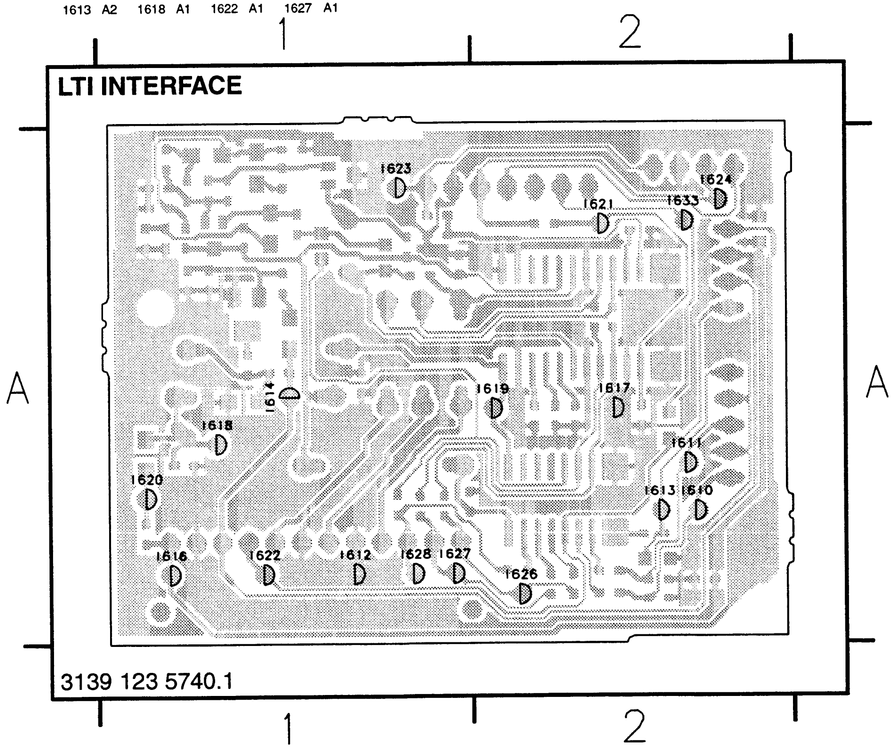
VIDEO
PIP
F2 PIP TUNER IF
MULTISTANDARD VIDEO DEMODULATION
UV1316/A
PIP + TV TUNER
VIDEO IF
VIDEO PLL DEM.
AGC
TDA9887
TUNER_AGC
SEL_P_N
SDA
SCL
F1 PIP-PROC.
SDA9488X
CVBS1_PIP
INPUT SWITCH
ADC
MULTI STANDARD DECODING
RGB MATRIX
DAC
FAST RGB SWITCH
SYNC. PROC.
INTF_PrRED_OUT
INTF_Y/GREEN_OUT
INTF_PbBLUE_OUT
INTF_FBL
INTF_CVBS_IN
INTF_CVBS_OUT
VD
HD_PIP
A5 CONN.
INTF_CVBS_IN (NC)
SEE BLOCK DIAGRAM DEFLECTION
H LTI/CTI
TDA8601T
CLAMP
3-STATE
TDA9178T
LTI/C+I PROC.
PULSE FORMER
INTF_Y_OUT
INTF_U_OUT
INTF_V_OUT
SANDCASTLE
SEE BLOCK DIAGRAM DEFLECTION
SEE BLOCK DIAGRAM CONTROL
A5 CONN.
INTF_Y/GREEN_IN
INTF_Pb/BLUE_IN
INTF_Pr/RED_IN
SC1_R/G/B
SC1_FBL
SSIF
TO AUDIO PART
SEE BLOCK DIAGRAM AUDIO
A4 HERCULES
7200-A (IF)
PHASE DISC
VCO
SWITCH
VIDEO IF
VIDEO DEMOD
SOUND TRAP
TUNER IF AGC
AUDIO IF QSS/AM
SOUND MIXER
AM SOUND DET.
FM/QSS
7200-B (CVBS I/O + FILTERS + COLOUR DECODING)
SC1_CVBS_OUT
SW_SC2_CVBS
SC1_CVBS_IN
SC2_Y/CVBS_IN
SIDE_Y/CVBS_IN
SC2_CHROMA_IN
SIDE_CHROMA_IN
INPUT SWITC-I
COMB FILTER &TRAP SWITCH
OUTPUT SWITCH
PAL, NTSC SECAM DECODER
VIDEO IDENT
INTF_CVBS_OUT
7200-C INPUT SWITCHING
DIGITAL SIGNAL PROC. - 4:3 LINEAR/NON-LINEAR SCALING - DOUBLE WINDOW PROC.
YPrPb2/ YPrPb3 SELECTION
RGB2/ RGB3 SELECTION
ADC
DAC
DVD TO DVD
RGB TO DVD
DVD TO YUV
YUV TO DVD
SELECTION LOGIC
A4 TUNER IF
FM-RADIO TUNER + TV TUNER
VT_SUPPLY
BZX79-C33
FILTER SELECTION
SEL-LLPM
A8 REAR I/O SCART (VIDEO PART)
SCART 1
SC1-CVBS-OUT
SC1-CVBS-IN
SC1-FBL
SC1-RED-IN
SC1-GREEN-IN
SC1-BLUE-IN
SC1-STATUS
SC1-R/G/B
SCART 2
SC2-CVBS-OUT
SC2-Y/CVBS-IN
SC2-CHROMA-IN
SC2-STATUS/ITV_MSG
SC2-CHROMA-IN
D SIDE AV
A5 CONNECTION
SIDE_CHROMA_IN
SIDE_Y/CVBS_IN
SVHS
VIDEO IN
A5
SW_SC2_CVBS
F201 2V / div DC
F203 2V / div DC
F205 500mV / div DC 10ms / div
F206 1V / div DC 20µs / div
F240 500mV / div DC 20µs / div
F241 500mV / div DC 20µs / div
F242 500mV / div DC 20µs / div
F331 500mV / div DC 20µs / div
F332 500mV / div DC 20µs / div
F333 500mV / div DC 20µs / div
F216 1V / div DC 20us / div
F217 1V / div DC 20us / div
F218 1V / div DC 20us / div
F224 500mV / div DC 20us / div
F225 500mV / div DC 20us / div
F226 500mV / div DC 20us / div
F338 50V / div DC 20us / div
F339 50V / div DC 20us / div
F341 50V / div DC 20us / div
A4 HERCULES
7200-D (YUV PROCESSING)
PEAKING
WHITE/BLACK STRETCH GAMMA COR.
TINT CONTROL SKINTONE
SATURATION
MATRIX
RGB ADDER
SCAVEM PROC.
7200-E (RGB PROCESSING + CATHODE CALIBRATION)
FROM µP PART
CLAMP + MUTE
BLUE STRETCH & CONTRAST
OSD INSERTION
BRIGHTNESS + PEAK WHITE LIM.
CATHODE CALIBRATION
OUTPUT STAGE
BEAM CURRENT LIM.
BCL
BOUT
GOUT
ROUT
IBLACK
SVM
ROT
B1 CRT
B2 SCAVEM
FILAMENT
ROTATION OUTPUT
ROTATION COIL (OPTIONAL)
FILAMENT VSVM
SCAVEM OUTPUT
SCAVEM COIL (OPTIONAL)
AQUADAG
CRT
BC_INFO
VSVM FILAMENT
EHT-b
+200V
+200VA
FROM DEFLECTION
to 1401 DEFLECTION
E_14480_085.eps
280504

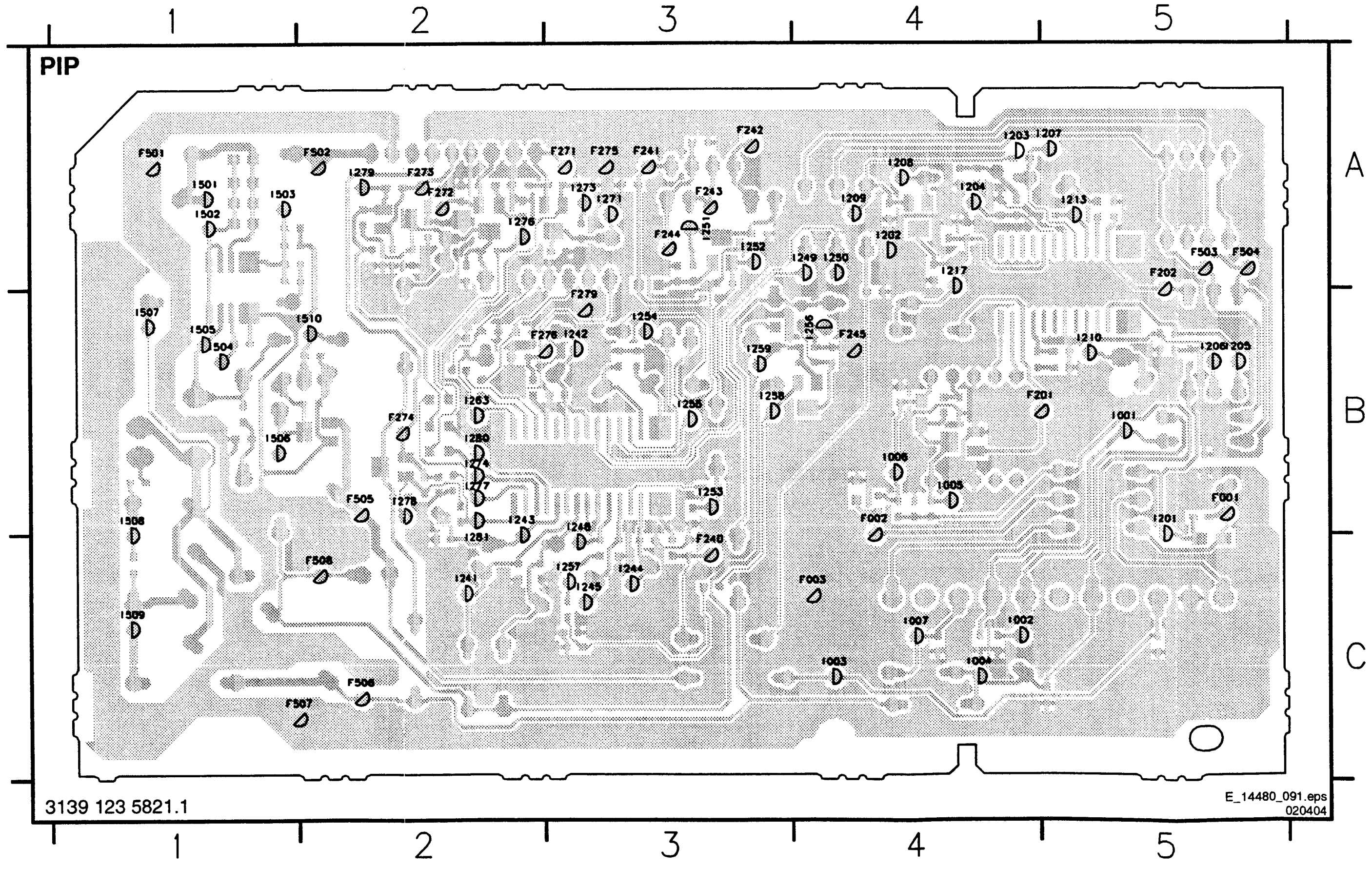
Testpoint Overview CRT, LTI & PIP Panel



F331	A1
F332	A1
F333	A1
F334	A1
F335	A1
F336	A1
F338	A1
F339	A2
F340	A2
F341	A2
F351	A1
F352	A1
F353	A1
F354	A1
F356	A2
F360	A1
F361	A3
F362	A3
F363	A3
F381	A3
F382	A3
I330	A1
I331	A1
I332	A1
I333	A1
I334	A1
I335	A1
I336	A2
I337	A1
I351	A1
I353	A2
I355	A2
I357	A1
I360	A1
I361	A2
I362	A2
I364	A3
I366	A3
I368	A3
I369	A3
I371	A3
I372	A3
I381	A2
I383	A2
I385	A2
I386	A2
I387	A3
I388	A2
I389	A2
I390	A2
I391	A2
I392	A1

1610	A2	1614	A1	1619	A2	1623	A1	1628	A1
1611	A2	1616	A1	1620	A1	1624	A2	1633	A2
1612	A1	1617	A2	1621	A2	1626	A2		
1613	A2	1618	A1	1622	A1	1627	A1		

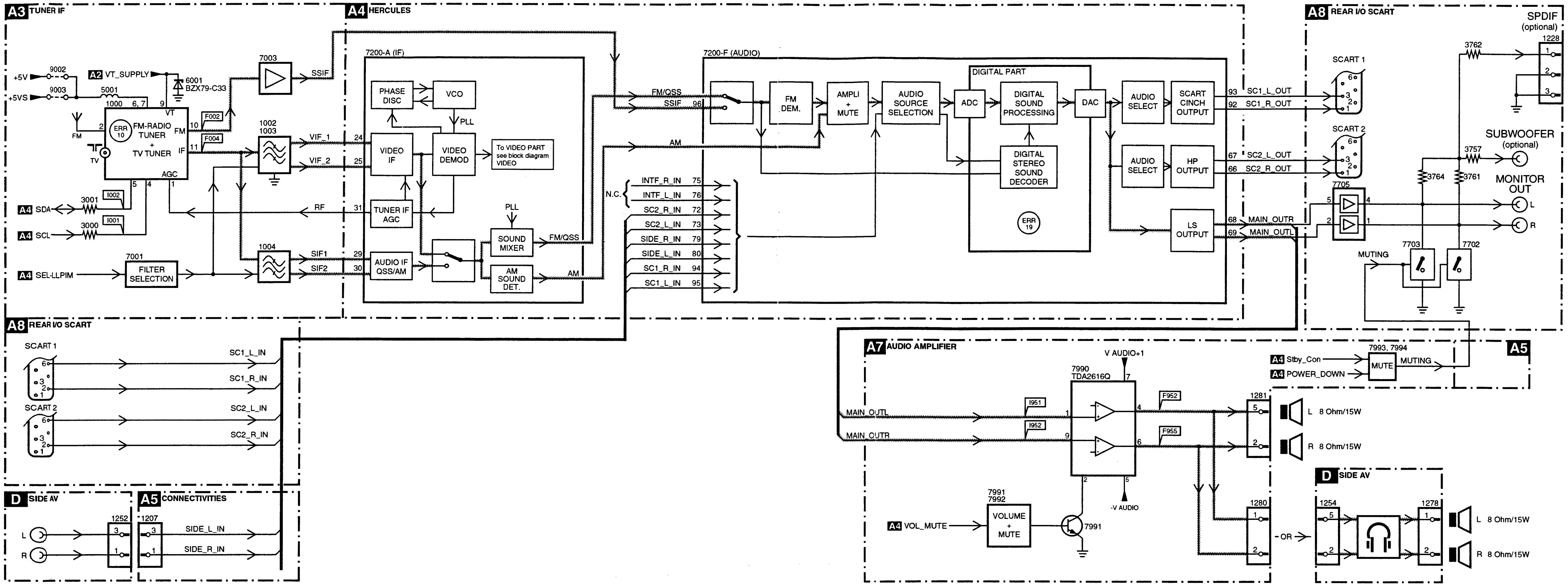




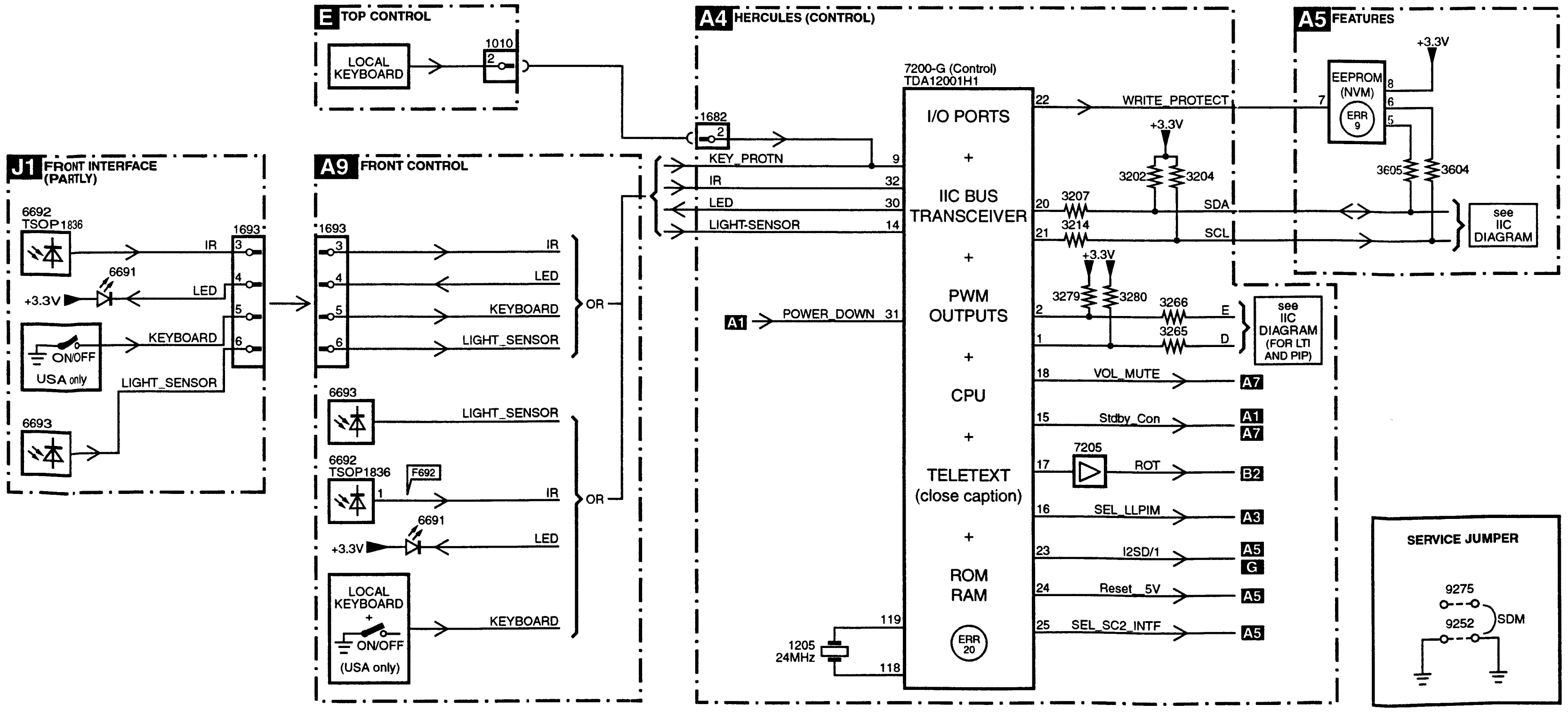
F001	B5	I254	B3
F002	B4	I255	B3
F003	C4	I256	B4
F201	B4	I257	C3
F202	A5	I258	B3
F240	C3	I259	B3
F241	A3	I263	B2
F242	A3	I271	A3
F243	A3	I273	A3
F244	A3	I274	B2
F245	B4	I276	A2
F271	A3	I277	B2
F272	A2	I278	B2
F273	A2	I279	A2
F274	B2	I280	B2
F275	A3	I281	C2
F276	B2	I501	A1
F279	B3	I502	A1
F501	A1	I503	A1
F502	A2	I504	B1
F503	A5	I505	B1
F504	A5	I506	B1
F505	B2	I507	B1
F506	C2	I508	B1
F507	C1		
F508	C2		
I001	B5		
I002	C4		
I003	C4		
I004	C4		
I005	B4		
I006	B4		
I007	C4		
I201	B5		
I202	A4		
I203	A4		
I204	A4		
I205	B5		
I206	B5		
I207	A5		
I208	A4		
I209	A4		
I210	B5		
I213	A5		
I217	A4		
I241	C2		
I242	B3		
I243	B2		
I244	C3		
I245	C3		
I248	B3		
I249	A4		
I250	A4		
I251	A3		
I252	A3		
I253	B3		

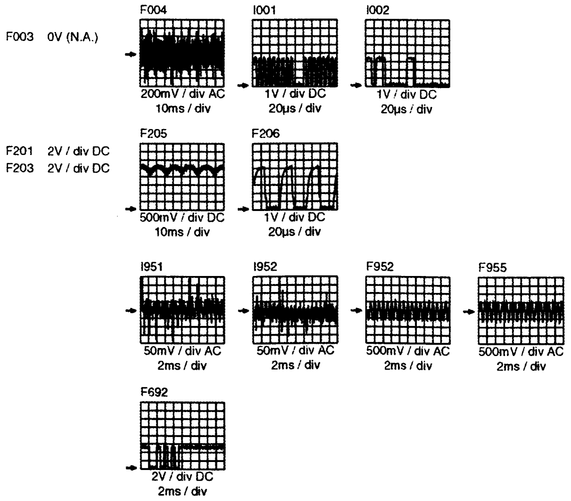
Block Diagram Audio/Control

AUDIO


A3 TUNER IF
+5V 9002
+5VS 9003
A2 VT_SUPPLY
6001 BZX79-C33
5001
1000 6, 7
FM-RADIO TUNER + TV TUNER
ERR 10
FM
TV
VT
IF
AGC
F002
F004
7003
SSIF
1002 1003
VIF_1
VIF_2
A4 SDA 3001 I002
A4 SCL 3000 I001
RF
7001 FILTER SELECTION
A4 SEL-LLPIM
1004
SIF1
SIF2
A4 HERCULES
7200-A (IF)
PHASE DISC
VCO
PLL
VIDEO IF
VIDEO DEMOD
To VIDEO PART see block diagram VIDEO
TUNER IF AGC
AUDIO IF QSS/AM
SOUND MIXER
AM SOUND DET.
FM/QSS
AM
7200-F (AUDIO)
FM/QSS
SSIF 96
AM
N.C.
INTF_R_IN 75
INTF_L_IN 76
SC2_R_IN 72
SC2_L_IN 73
SIDE_R_IN 79
SIDE_L_IN 80
SC1_R_IN 94
SC1_L_IN 95
FM DEM.
AMPLI + MUTE
AUDIO SOURCE SELECTION
DIGITAL PART
ADC
DIGITAL SOUND PROCESSING
DAC
DIGITAL STEREO SOUND DECODER
ERR 19
AUDIO SELECT
SCART CINCH OUTPUT
AUDIO SELECT
HP OUTPUT
LS OUTPUT
93 SC1_L_OUT
92 SC1_R_OUT
67 SC2_L_OUT
66 SC2_R_OUT
68 MAIN_OUTR
69 MAIN_OUTL
A8 REAR I/O SCART
SCART 1
SCART 2
SPDIF (optional)
1228
3762
SUBWOOFER (optional)
3757
3764
3761
MONITOR OUT
L
R
7705
7703
7702
MUTING
A8 REAR I/O SCART
SCART 1
SC1_L_IN
SC1_R_IN
SCART2
SC2_L_IN
SC2_R_IN
D SIDE AV
L
R
1252
A5 CONNECTIVITIES
1207
SIDE_L_IN
SIDE_R_IN
A7 AUDIO AMPLIFIER
V AUDIO+1
7990 TDA2616Q
MAIN_OUTL
MAIN_OUTR
I951
I952
F952
F955
1281
L 8 Ohm/15W
R 8 Ohm/15W
-V AUDIO
7991 7992
VOLUME + MUTE
7991
A4 VOL_MUTE
1280
- OR -
A5
A4 Stby_Con
A4 POWER_DOWN
7993, 7994
MUTE
MUTING
D SIDE AV
1254
1278
L 8 Ohm/15W
R 8 Ohm/15W

CONTROL

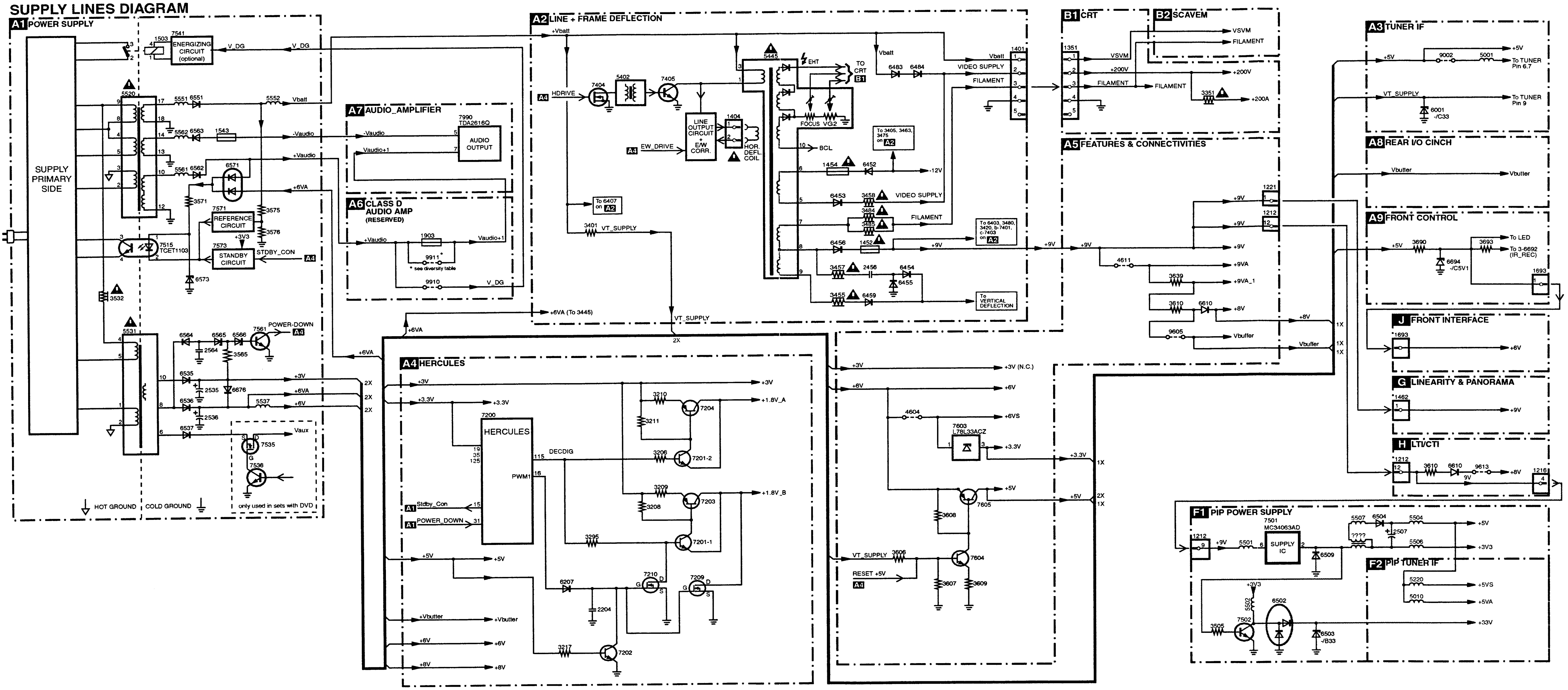

E TOP CONTROL
LOCAL KEYBOARD
1010
J1 FRONT INTERFACE (PARTLY)
6692 TSOP1836
IR
6691
+3.3V
LED
KEYBOARD
ON/OFF
USA only
LIGHT_SENSOR
6693
1693
A9 FRONT CONTROL
1693
IR
LED
KEYBOARD
LIGHT_SENSOR
OR
6693
LIGHT_SENSOR
6692 TSOP1836
F692
IR
6691
+3.3V
LED
LOCAL KEYBOARD + ON/OFF (USA only)
KEYBOARD
OR
A4 HERCULES (CONTROL)
1682
KEY_PROTN 9
IR 32
LED 30
LIGHT-SENSOR 14
7200-G (Control) TDA12001H1
I/O PORTS + IIC BUS TRANSCEIVER + PWM OUTPUTS + CPU + TELETEXT (close caption) + ROM RAM
ERR 20
A1 POWER_DOWN 31
1205 24MHz
119
118
22 WRITE_PROTECT
+3.3V
3202
3204
20 3207 SDA
21 3214 SCL
+3.3V
3279
3280
3266
3265
2 E
1 D
see IIC DIAGRAM (FOR LTI AND PIP)
18 VOL_MUTE A7
15 Stdby_Con A1 A7
17 7205 ROT B2
16 SEL_LLPIM A3
23 I2SD/1 A5 G
24 Reset_5V A5
25 SEL_SC2_INTF A5
A5 FEATURES
+3.3V
EEPROM (NVM)
ERR 9
7
8
6
5
3605
3604
see IIC DIAGRAM
SERVICE JUMPER
9275
9252
SDM



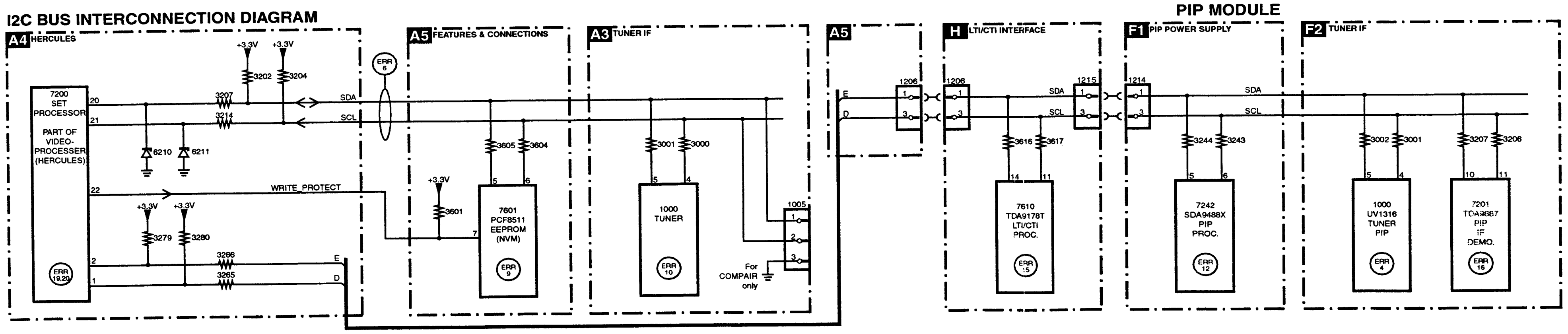
E_14480_087.eps
280504

I2C and Supply Voltage Overview

SUPPLY LINES DIAGRAM


A1 POWER SUPPLY
SUPPLY PRIMARY SIDE
ENERGIZING CIRCUIT (optional)
V_DG
Vbatt
-Vaudio
+Vaudio
+6VA
REFERENCE CIRCUIT
STANDBY CIRCUIT
STDBY_CON
7515 TCET1103
POWER-DOWN
+3V
+6V
Vaux
only used in sets with DVD
HOT GROUND
COLD GROUND
A7 AUDIO_AMPLIFIER
7990 TDA2616Q
AUDIO OUTPUT
A6 CLASS D AUDIO AMP (RESERVED)
* see diversity table
A2 LINE + FRAME DEFLECTION
HDRIVE
EW_DRIVE
LINE OUTPUT CIRCUIT + E/W CORR.
HOR. DEFL. COIL
EHT
TO CRT B1
FOCUS
VG2
BCL
VIDEO SUPPLY
FILAMENT
VT_SUPPLY
+12V
+9V
To VERTICAL DEFLECTION
+6VA (To 3445)
A4 HERCULES
HERCULES
DECDIG
PWM1
Stdby_Con
POWER_DOWN
+3.3V
+1.8V_A
+1.8V_B
+5V
+Vbutter
+8V
RESET +5V
L78L33ACZ
+6VS
+3V (N.C.)
B1 CRT
B2 SCAVEM
VSVM
+200V
+200A
A5 FEATURES & CONNECTIVITIES
+9VA
+9VA_1
Vbuffer
A3 TUNER IF
To TUNER Pin 6,7
To TUNER Pin 9
A8 REAR I/O CINCH
A9 FRONT CONTROL
To LED
To 3-6692 (IR_REC)
J FRONT INTERFACE
G LINEARITY & PANORAMA
H LTI/CTI
F1 PIP POWER SUPPLY
7501 MC34063AD
SUPPLY IC
F2 PIP TUNER IF
+3V3
+5VS
+5VA
+33V

I2C BUS INTERCONNECTION DIAGRAM


PIP MODULE
A4 HERCULES
7200 SET PROCESSOR
PART OF VIDEO-PROCESSER (HERCULES)
SDA
SCL
WRITE_PROTECT
ERR 6
ERR 19,20
A5 FEATURES & CONNECTIONS
7601 PCF8511 EEPROM (NVM)
ERR 9
A3 TUNER IF
1000 TUNER
ERR 10
For COMPAIR only
A5
H LTI/CTI INTERFACE
7610 TDA9178T LTI/CTI PROC.
ERR 15
F1 PIP POWER SUPPLY
7242 SDA9488X PIP PROC.
ERR 12
F2 TUNER IF
1000 UV1316 TUNER PIP
ERR 4
7201 TDA9887 PIP IF DEMO.
ERR 16

ERROR CODE LIST

ERROR	Device	Error description	Check item	Diagram
0	Not applicable	No Error		
1	Not applicable	X-Ray / over-voltage protection (US only)	2411, 2412, 2413, 6404, 6411, 6412.	A2
2	Not applicable	High beam (BCI) protection	3404, 7405	A2
3	Not applicable	Vertical guard protection	3466, 7451, 7452, 7453, 7454	A2
4	Tuner UA1316/A	I^2C error while communicating with 2nd tuner	1000, 5010 (PIP Module)	F2
5	Not applicable	+5v protection	7604, 7605	A5
6	I2C bus	General I^2C error	7200, 3207, 3214	A4
7	Not applicable	-	-	-
8	Not applicable	-	-	-
9	24C16	I^2C error while communicating with the EEPROM	7601, 3604, 3605	A5
10	Tuner	= I^2C error while communicating with the PLL tuner	1000, 5001	A3
11	TDA6107/A	Black current loop instability protection	7330, 3351, CRT	B1
12	SDA9488X	I^2C error while communicating with the PIP processor	7242 (PIP Module)	F1
13	Not applicable	-	-	-
14	DVD Loader	I2C error while communicating with the DVD Interface module	DVD Interface module	DVD Loader
15	TDA9178T/N1	I2C error while communicating with LTI module	7610	H
16	TDA9887	I2C error while communicating with PIP_Demodulator	7201	F2
17	Not applicable	-	-	-
18	Not applicable	-	-	-
19	TDA1200	I2C error while communicating with SSD stereo sound decoder	7200	A4
20	TDA1200	I2C error while communicating with video cosmic in Hercules IC	7200	A4

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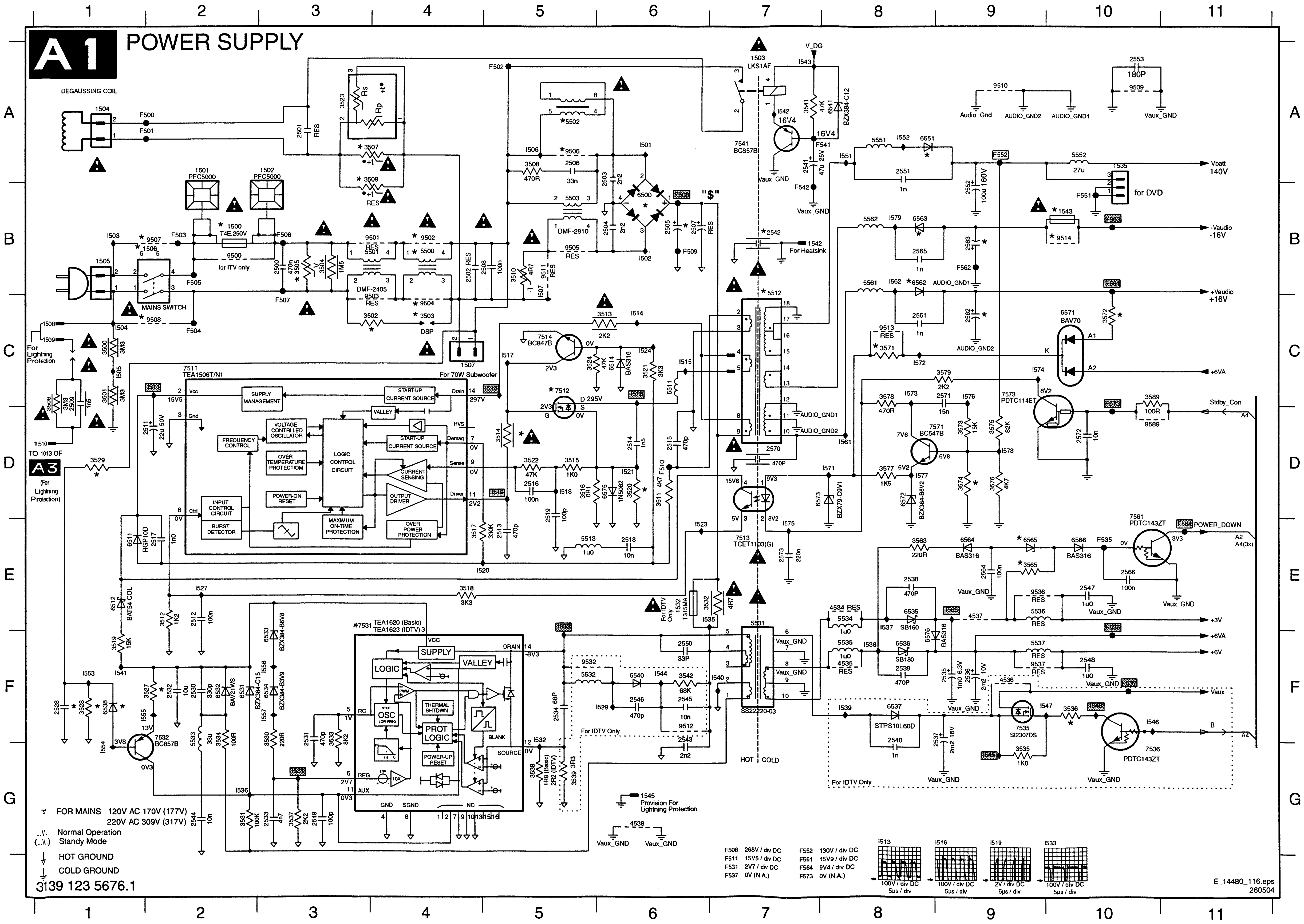
7. Circuit Diagrams and PWB Layouts

Mono Carrier: Power Supply


A1
POWER SUPPLY
DEGAUSSING COIL
MAINS SWITCH
for ITV only
For Lightning Protection
TO 1013 OF A3
(For Lightning Protection)
7511 TEA1506T/N1
SUPPLY MANAGEMENT
START-UP CURRENT SOURCE
VALLEY
VOLTAGE CONTROLLED OSCILLATOR
FREQUENCY CONTROL
LOGIC CONTROL CIRCUIT
OVER TEMPERATURE PROTECTION
START-UP CURRENT SOURCE
CURRENT SENSING
POWER-ON RESET
OUTPUT DRIVER
INPUT CONTROL CIRCUIT
BURST DETECTOR
MAXIMUM ON-TIME PROTECTION
OVER POWER PROTECTION
For 70W Subwoofer
*7531 TEA1620 (Basic) TEA1623 (IDTV)
SUPPLY
VALLEY
LOGIC
OSC
THERMAL SHTDWN
PROT LOGIC
POWER-UP RESET
BLANK
SOURCE
For IDTV Only
1503 LKS1AF
V_DG
for DVD
Vbatt 140V
-Vaudio -16V
+Vaudio +16V
+6VA
Stdby_Con
POWER_DOWN
+3V
+6VA
+6V
Vaux
For Heatsink
HOT COLD
1545 Provision For Lightning Protection
Audio_Gnd
AUDIO_GND2
AUDIO_GND1
Vaux_GND
"$"
'$' FOR MAINS 120V AC 170V (177V)
220V AC 309V (317V)
..V.. Normal Operation
(..V..) Standy Mode
HOT GROUND
COLD GROUND
3139 123 5676.1
F508 268V / div DC
F511 15V5 / div DC
F531 2V7 / div DC
F537 0V (N.A.)
F552 130V / div DC
F561 15V9 / div DC
F564 9V4 / div DC
F573 0V (N.A.)
I513 100V / div DC 5µs / div
I516 100V / div DC 5µs / div
I519 2V / div DC 5µs / div
I533 100V / div DC 5µs / div
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260504

1500	B2
1501	A2
1502	A3
1503	A7
1504	A1
1505	B1
1506	B1
1507	C4
1508	C1
1509	C1
1510	D1
1532	E6
1535	A10
1542	B8
1543	B10
1545	G6
2500	B3
2501	A3
2502	B4
2503	A6
2504	B6
2505	B6
2506	A5
2507	B6
2508	B5
2509	C1
2511	D2
2512	E2
2513	E5
2514	D6
2515	D6
2516	D5
2517	E2
2518	E6
2519	D5
2528	F1
2530	F2
2531	F3
2532	F2
2533	G3
2534	F5
2535	F9
2536	F9
2537	F9
2538	E8
2539	F8
2540	G8
2541	A7
2542	B7
2543	F6
2544	G2
2545	F6
2546	F6
2547	E10
2548	F10
2549	G3
2550	F6
2551	A8
2552	B9
2553	A10
2561	C8
2562	C9
2563	B9
2564	E9
2565	B8
2566	E10
2570	D7
2571	C9
2572	D10
2573	E7
3500	C1
3501	C1
3502	C4
3503	C4
3504	B3
3505	B3
3506	C1
3507	A4
3508	A5
3509	A4
3510	B5
3511	D6
3512	E2
3513	C6
3514	D5
3515	D5
3516	D5
3517	E4
3518	E4
3519	F1
3520	D6
3521	C6
3522	D5
3523	A3
3524	C5
3527	F2
3528	F1
3529	D1
3530	F3
3531	G2
3532	E6
3533	F3
3534	F2
3535	G9
3536	F10
3537	G3
3538	G5
3539	G5
3541	A7
3542	F6
3563	E8
3565	E9
3571	C8
3572	C10
3573	D9
3574	D9
3575	D9
3576	D9
3577	D8
3578	C8
3579	C9
3589	C10
4534	E8
4535	F8
4536	F9
4537	E9
4538	G6
5500	B4
5501	B4
5502	A5
5503	B5
5511	C6
5512	C7
5513	E5
5531	E7
5532	F5
5533	F2
5534	E8
5535	F8
5536	E9
5537	F9
5551	A8
5552	A10
5561	B8
5562	B8
6500	B6
6511	E1
6512	E1
6514	C6
6531	F2
6532	F2
6533	F3
6534	F3
6535	E8
6536	F8
6537	F8
6538	F1
6540	F6
6541	A8
6551	A8
6562	B8
6563	B8
6564	E9
6565	E9
6566	E10
6571	C10
6572	D8
6573	D8
6575	D6
6576	F8
7511	C2
7512	C5
7513	E7
7514	C5
7531	E3
7532	F2
7535	F9
7536	G10
7541	A7
7561	E10
7571	D9
7573	C9
9500	B2
9501	B4
9502	B4
9503	C4
9504	C4
9505	B5
9506	A5
9507	B2
9508	C2
9509	A10
9510	A9
9511	B5
9512	F6
9513	C8
9514	B10
9532	F5
9536	E9
9537	F9
9589	D10
F500	A2
F501	A2
F502	A5
F503	B2
F504	C2
F505	B2
F506	B3
F507	C3
F508	B6
F509	B6
F510	D6
F535	E10
F536	E10
F537	F10
F541	A8
F542	B7
F551	B10
F552	A9
F561	B10
F562	B9
F563	B10
F564	E11
F573	C10
I501	A6
I502	B6
I503	B1
I504	C1
I505	C1
I506	A5
I507	B5
I511	C2
I513	C5
I514	C6
I515	C6
I516	C6
I517	C5
I518	D5
I519	D5
I520	E5
I521	D6
I523	E6
I524	C6
I527	E2
I529	F6
I531	G3
I532	F5
I533	E5
I535	E6
I536	G2
I537	E8
I538	F8
I539	F8
I540	F7
I541	F1
I542	A7
I543	A7
I544	F6
I545	G9
I546	F10
I547	F10
I548	F10
I551	A8
I552	A8
I553	F1
I554	G1
I555	F1
I556	F3
I557	F3
I561	D8
I562	B8
I565	E9
I571	D8
I572	C8
I573	C8
I574	C9
I575	E7
I576	C9
I577	D8
I578	D9
I579	B8

Mono Carrier: Diversity Table for A1 (Power Supply)

DIVERSITY TABLE FOR A 1 POWER SUPPLY

REGION	NAFTA			LATAM / AP					
MAIN RANGE	LR			FR					
SET	27RF 27FSQ	32RF	26WSRF 30WSRF 32FSQ	21RF	25RF 29FSQ	29RF	29RF	28WSSF	28WSRF 32WSRF
VBATT	130V	130V	143V	130V	130V	130V	130V	143V	143V
AUDIO OUTPUT	2X5W 2X10W	2X5W 2X10W	2X5W 2X10W	2X10W	2X5W 2X10W	2X5W	2X10W	2X5W	2X10W
1508	---	---	---	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK
1510	---	---	---	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK
2505	200V 470U	200V 470U	200V 470U	400V 330U	400V 330U	400V 330U	400V 330U	400V 330U	400V 330U
2506	---	---	---	---	---	---	---	---	---
2508	---	---	---	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N
2509	---	---	---	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5
2528	---	---	---	470N	470N	470N	470N	470N	470N
2542	250V 1N5	250V 1N5	250V 1N5	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N
2570	---	---	---	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P
3505	1MA/423V	1MA/423V	1MA/423V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V
3506	---	---	---	3M3	3M3	3M3	3M3	3M3	3M3
3507	---	144V 3R	144V 3R	---	---	---	---	---	---
3508	---	---	---	---	---	---	---	---	---
3514	100R	100R	100R	47R	47R	47R	47R	47R	47R
3520	0R18	0R18	0R18	0R33	0R33	0R33	0R22	0R33	0R22
3527	---	---	---	47K	47K	47K	47K	47K	47K
3528	---	---	---	1M	1M	1M	1M	1M	1M
3529	---	---	---	2M2	2M2	2M2	2M2	2M2	2M2
3523	145V 1R5	---	---	276V 4R5	276V 4R5	276V4R5	276V 4R5	276V 4R5	276V 4R5
3565	15K	15K	15K	18K	18K	18K	18K	18K	18K
3574	150K	150K	33K	150K	150K	150K	150K	33K	33K
5500	---	---	---	10MH 2A	10MH 2A	10MH 2A	10MH 2A	10MH 2A	10MH 2A
5502	---	---	---	---	---	---	---	---	---
5512	SS40310-01	SS40310-01	SS40312-01	SS42315-01	SS42315-01	SS42315-01	SS49309-01	SS42316-01	SS49308-01
6500	GBU4JL	GBU6JL	GBU6JL	GBU4JL	GBU4JL	GBU6JL	GBU6JL	GBU6JL	GBU6JL
6538	---	---	---	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316
6551	STTH8L06D	BYV29X-500	BYV29X-500	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	BYV29X-500
6565	UDZS9.1B	UDZS9.1B	UDZS9.1B	UDZS7.5B	UDZS7.5B	UDZS7.5B	UDZS7.5B	UDZS7.5B	UDZS7.5B
7512	FQPF9N50	FQPF9N50	FQPF9N50	FQPF7N80	STP10NK8OZFP	STP10NK8OZFP	STP10NK8OZFP	STP10NK8OZFP	STP10NK8OZFP
7532	---	---	---	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B
9502	JMP	JMP	JMP	---	---	---	---	---	---
9504	JMP	JMP	JMP	---	---	---	---	---	---
9506	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP

REGION	CHINA			INDIA		EUROPE					
MAIN RANGE	HR			HR		HR					
SET	21/25RF	29RF	34RF	21/29RF	21/29RF 29FSQ	21RF	29RF 28WSSF	29RF	24WR 25/28BLD	28WSRF	32WSRF
VBATT	130V	130V	130V	130V	130V	130V	130V	130V	143V	143V	143V
AUDIO OUTPUT	2X10W	2X5W 2X10W	2X10W	2X5W 2X10+20W	2X15W	2X5W 2X10W	2X5W	2X10W	2X5W 2X10W	2X5W 2X10W	2X5W 2X10W
1508	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK
1510	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK
2505	450V 220U	450V 220U	450V 220U	450V 220U	450V 220U	400V 220U	400V 220U	400V 220U	400V 220U	400V 220U	400V 220U
2506	---	400V 33N	400V 33N	---	---	---	---	400V 33N	---	400V 33N	400V 33N
2508	275V 100N	275V 100N	275V 100N	---	---	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N
2509	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5
2528	470N	470N	470N	470N	470N	470N	470N	470N	470N	470N	470N
2542	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N
2570	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P
3505	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V
3506	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3
3507	---	---	---	---	---	---	---	---	---	---	---
3508	---	470R	470R	---	---	---	---	470R	---	470R	470R
3514	47R	47R	47R	47R	47R	47R	47R	47R	47R	47R	47R
3520	0R33	0R33	0R33	0R33	0R33	0R33	0R33	0R33	0R33	0R33	0R33
3527	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K
3528	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M
3529	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2
3523	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5
3565	15K	15K	15K	15K	15K	15K	15K	15K	15K	15K	15K
3574	150K	150K	150K	150K	150K	150K	150K	150K	33K	33K	33K
5500	20MH 1A5	20MH 1A5	20MH 1A5	---	---	20MH 1A5	20MH 1A5	20MH 1A5	20MH 1A5	20MH 1A5	20MH 1A5
5502	---	65MH	65MH	---	---	---	---	65MH	---	65MH	38MH
5512	SS42315-01	SS42315-01	SS42315-01	SS42315-01	SS42317-01	SS42315-01	SS42315-01	SS42315-01	SS42316-01	SS42316-01	SS42316-01
6500	GBU4JL	GBU4JL	BYV29X-500	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL
6538	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316
6551	STTH8L06D	STTH8L06D	GBU4JL	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	BYV29X-500
6565	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B
7512	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80
7532	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B
9502	---	---	---	JMP	JMP	---	---	---	---	---	---
9504	---	---	---	JMP	JMP	---	---	---	---	---	---
9506	JMP	---	---	JMP	JMP	JMP	JMP	---	JMP	---	---

AUDIO OUTPUT	2X5W	2X10W ---	2X10+20W ---	2X15W
1543	---	---	2A 250V	2A250V
2562	25V 1000uF	25V 2200uF	25V 2200uF	25V 2200uF
2563	25V 1000uF	25V 2200uF	25V 2200uF	25V 2200uF
3571	220R	220R	220R	680R
3572	220R	220R	220R	470R
6562	SB360	SB360	SB360	SB380
6563	SB360	SB360	SB360	SB380
9514	JMP	JMP	---	---

REGION	NAFTA	ROW
1506	---	Main Switch
9507	JMP	---
9508	JMP	---

3139 123 5676.1

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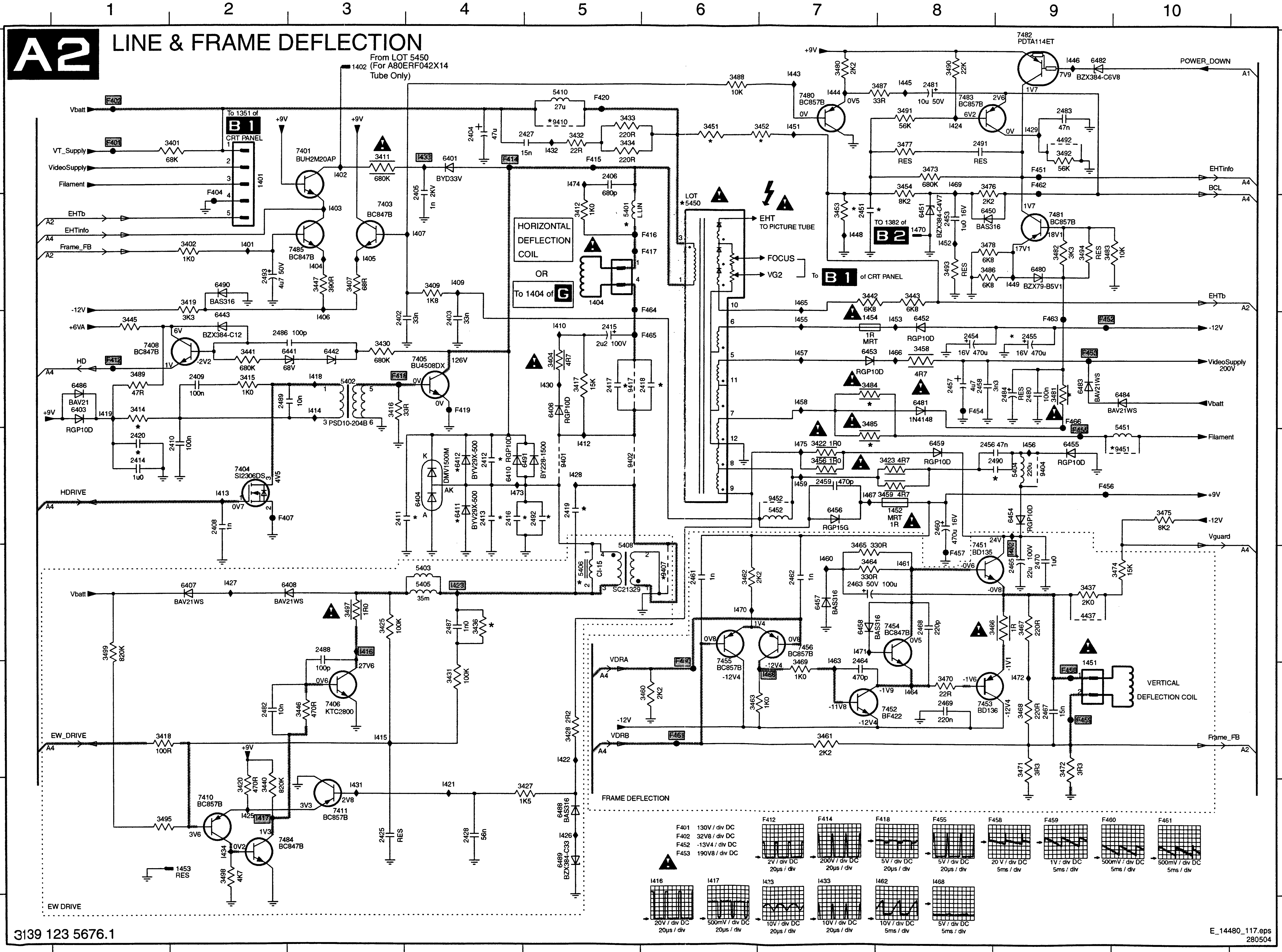
Mono Carrier: Deflection


A2
LINE & FRAME DEFLECTION
From LOT 5450
(For A80ERF042X14
Tube Only)
To 1351 of B1 CRT PANEL
Vbatt
VT_Supply
VideoSupply
Filament
EHTb
EHTinfo
Frame_FB
-12V
+6VA
HD
+9V
HDRIVE
EW_DRIVE
7401 BUH2M20AP
7403 BC847B
7485 BC847B
7408 BC847B
7405 BU4508DX
7404 SI2306DS
7406 KTC2800
7410 BC857B
7411 BC857B
7484 BC847B
5402 PSD10-204B
HORIZONTAL DEFLECTION COIL
OR
To 1404 of G
LOT 5450
EHT
TO PICTURE TUBE
FOCUS
VG2
To B1 of CRT PANEL
TO 1382 of B2
7480 BC857B
7482 PDTA114ET
7483 BC857B
7481 BC857B
POWER_DOWN
EHTinfo
BCL
EHTb
-12V
VideoSupply 200V
Vbatt
Filament
+9V
-12V
Vguard
Frame_FB
VDRA
VDRB
7455 BC857B
7456 BC857B
7454 BC847B
7452 BF422
7453 BD136
7451 BD135
5408 SC21329
VERTICAL DEFLECTION COIL
FRAME DEFLECTION
EW DRIVE
F401 130V / div DC
F402 32V8 / div DC
F452 -13V4 / div DC
F453 190V8 / div DC
F412 2V / div DC 20μs / div
F414 200V / div DC 20μs / div
F418 5V / div DC 20μs / div
F455 5V / div DC 20μs / div
F458 20 V / div DC 5ms / div
F459 1V / div DC 5ms / div
F460 500mV / div DC 5ms / div
F461 500mV / div DC 5ms / div
I416 20V / div DC 20μs / div
I417 500mV / div DC 20μs / div
I423 10V / div DC 20μs / div
I433 10V / div DC 20μs / div
I462 10V / div DC 5ms / div
I468 5V / div DC 5ms / div
3139 123 5676.1
E_14480_117.eps
280504

1401	A2
1402	A3
1404	B5
1451	F9
1452	D8
1453	G2
1454	C7
1470	B8
2402	C3
2403	C4
2404	A4
2405	A4
2406	A5
2408	D2
2409	C2
2410	D2
2411	D3
2412	D4
2413	D4
2414	D1
2415	C5
2416	D4
2417	C5
2418	C6
2419	D5
2420	D1
2425	G3
2427	A5
2428	G4
2451	B7
2453	B8
2454	C8
2455	C9
2456	D8
2457	C8
2458	C8
2459	D7
2460	D8
2461	E6
2462	E7
2463	E7
2464	F7
2465	E9
2467	F9
2468	E8
2469	F8
2470	E9
2480	C9
2481	A8
2482	F2
2483	A9
2484	C9
2486	C2
2487	E4
2488	E3
2489	C2
2490	D9
2491	A8
2492	D5
2493	B2
3401	A2
3402	B2
3404	C5
3407	B3
3409	B4
3411	A3
3412	B5
3414	C1
3415	C2
3416	C3
3417	C5
3418	F1
3419	B2
3420	G2
3422	D7
3423	D8
3425	E3
3427	G5
3428	F5
3430	C3
3431	F4
3432	A5
3433	A5
3434	A5
3436	E4
3437	E9
3440	G2
3441	C2
3442	B7
3443	B8
3445	C1
3446	F3
3447	B3
3451	A6
3452	A7
3453	B7
3454	A8
3456	D7
3458	C8
3459	D8
3460	F6
3461	F7
3462	E6
3463	F6
3464	E7
3465	E7
3466	E9
3467	E9
3468	F9
3469	F7
3470	F8
3471	F9
3472	F9
3473	A8
3474	E10
3475	D10
3476	A8
3477	A8
3478	B8
3480	A7
3481	C9
3482	B9
3483	B9
3484	C7
3485	C7
3486	B8
3487	A8
3488	A6
3489	C1
3490	A8
3491	A8
3492	A9
3493	B8
3494	B9
3495	G1
3497	E3
3498	G2
3499	E1
4437	E9
4492	A9
5401	B5
5402	C3
5403	E4
5404	D9
5405	E4
5406	E5
5408	D5
5410	A5
5450	B6
5451	D10
5452	D7
6401	A4
6403	C1
6404	D4
6406	C5
6407	E2
6408	E3
6410	D4
6411	D4
6412	D4
6441	C3
6442	C3
6443	C2
6450	B8
6451	B8
6452	C8
6453	C7
6454	D9
6455	D9
6456	D7
6457	E7
6458	E7
6459	D8
6480	B9
6481	C8
6482	A9
6483	C9
6484	C10
6486	C1
6488	G5
6489	G5
6490	B2
6491	D4
7401	A3
7403	B3
7404	D2
7405	C4
7406	F3
7408	C1
7410	G2
7411	G3
7451	E8
7452	F8
7453	F8
7454	E8
7455	E6
7456	E7
7480	A7
7481	B9
7482	A9
7483	A8
7484	G2
7485	B3
9401	D5
9402	D5
9404	D9
9407	E6
9410	A5
9417	C5
9451	D10
9452	D7
F401	A1
F402	A1
F404	B2
F407	D2
F412	C1
F414	A4
F415	A5
F416	B6
F417	B6
F418	C3
F419	C4
F420	A5
F451	A9
F452	C9
F453	C9
F454	C8
F455	D9
F456	D9
F457	E8
F458	F9
F459	F9
F460	E6
F461	F6
F462	A9
F463	C9
F464	C6
F465	C6
F466	C9
I401	B2
I402	A3
I403	B3
I404	B3
I405	B3
I406	C3
I407	B4
I409	B4
I410	C5
I412	D5
I413	D2
I414	C3
I415	F3
I416	E3
I417	G2
I418	C3
I419	C1
I421	G4
I422	F5
I423	E4
I424	A8
I425	G2
I426	G5
I427	E2
I428	D5
I429	A9
I430	C5
I431	G3
I432	A5
I433	A4
I434	G2
I443	A7
I444	A7
I445	A8
I446	A9
I448	B7
I449	B9
I451	A7
I452	B8
I453	C8
I455	C7
I456	D9
I457	C7
I458	C7
I459	D7
I460	E7
I461	E8
I462	E9
I463	E7
I464	F8
I465	B7
I466	C8
I467	D7
I468	F7
I469	A8
I470	E6
I471	E7
I472	F9
I473	D4
I474	A5
I475	D7

Mono Carrier: Diversity Table for A2 (Deflection)

DIVERSITY TABLE FOR A2 DEFLECTION

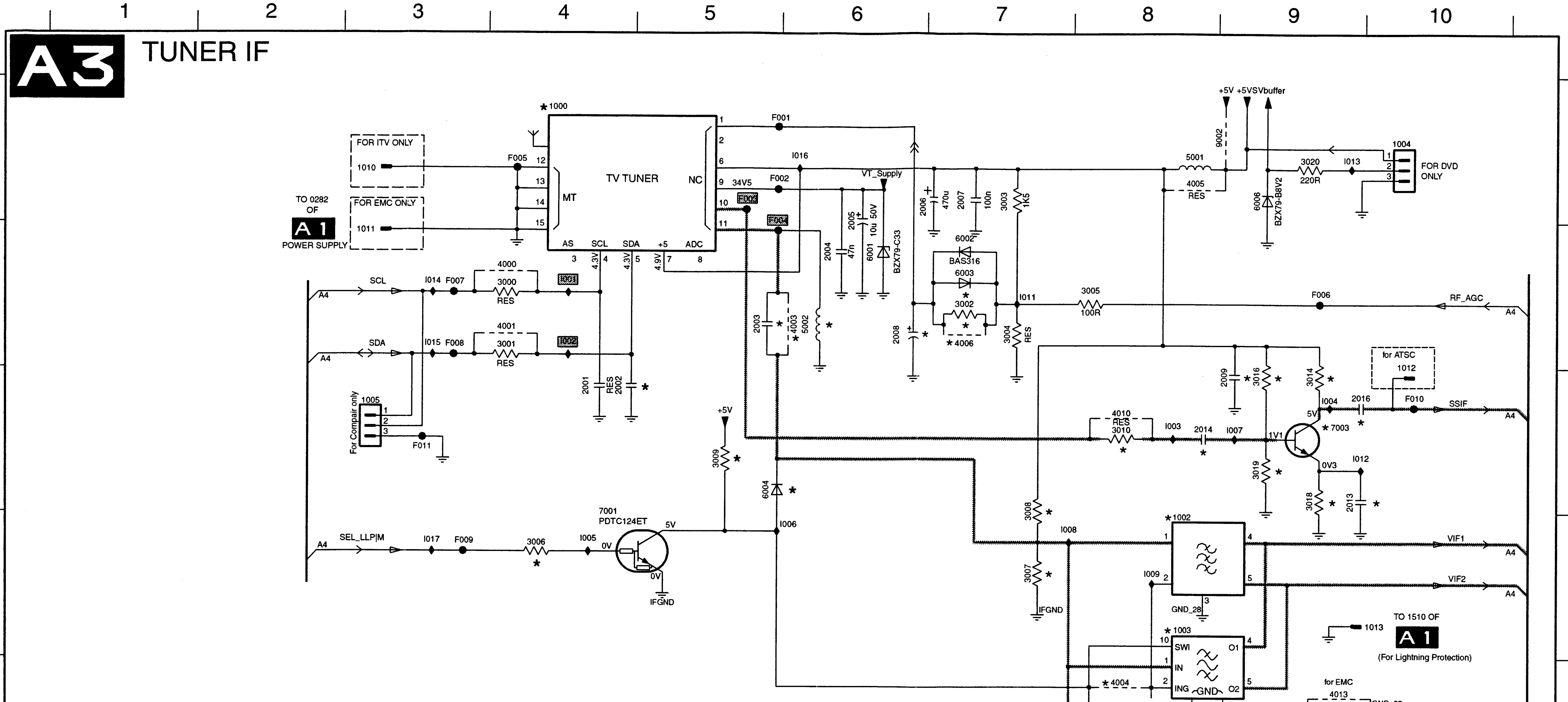
Region	NAFTA							LATAM					
Tube	LPD	LPD	LPD	LPD	LPD	LPD	SMGK	LPD	LPD	LPD	LPD	LPD	SMGK
Size	27 V	28 WR	29 RF	32 V	32 V RF	32 WR	25 RF	25 RF	27V	28WS	28WR	32WR	29RF
2411	470pF	1.2nF	1.5nF	2.2nF	680pF	330pF	1.2nF	680nF	470pF	1.2nF	1.2nF	330pF	1.5nF
2412	12nF	13nF	15nF	15nF	12nF	13nF	15nF	15nF	12nF	15nF	13nF	13nF	15nF
2413	120nF	15nF	39nF	33nF	33nF	18nF	33nF	33nF	120nF	18nF	15nF	18nF	39nF
2416	-	3n3	-	-	4n7	-	-	-	-	2n2	3n3	-	-
2418	390nF	-	330nF	470nF	270nF	-	390nF	360nF	390nF	-	-	-	330nF
2419	-	390nF	2u2	2u2	2u2	430nF	2u2	2u2	-	470nF	390nF	430nF	2u2
2425	-	33nF	33nF	33nF	10nF	33nF	33nF	33nF	-	33nF	33nF	33nF	33nF
2451	150nF	150nF	180nF	180nF	150nF	180nF	100nF	100nF	150nF	120nF	150nF	180nF	100nF
2457	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7
2487	-	1n5	1n5	1n5	2n2	1n5	1n5	1n5	-	1n5	1n5	1n5	3n3
2490	47n	-	-	-	-	-	47n	-	47n	-	-	-	-
3224	680K 5%	680K 5%	680K 5%	680K 5%	560K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	560K 5%	680K 5%	680K 5%
3295	8K2 5%	10K 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	10K 5%	8K2 5%	8K2 5%
3414	1R 1W 5%	2R2 1W 5%	1R 1W 5%	0R33 1W 5%	1R 1W 5%	6R8 1W 5%	3R3 1W 5%	1R 1W 5%	1R 1W 5%	4R7 1W 5%	2R2 1W 5%	6R8 1W 5%	0R33 1W 5%
3431	82K 1%	82K 1%	82K 1%	82K 1%	10K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%
3451	68K 1%	82K 1%	68K 1%	75K 1%	68K 1%	82K 1%	68K 1%	68K 1%	68K 1%	120K 1%	82K 1%	82K 1%	68K 1%
3452	18K 5%	15K 5%	15K 5%	15K 5%	6K8 5%	6K8 5%	18K 5%	18K 5%	18K 5%	27K 5%	15K 5%	6K8 5%	15K 5%
3453	33K 5%	22K 5%	33K 5%	22K 5%	33K 5%	22K 5%	33K 5%	33K 5%	33K 5%	33K 5%	22K 5%	22K 5%	33K 5%
3467	120R 5%	120R 5%	120R 5%	220R 5%	150R 5%	220R 5%	120R 5%	120R 5%	120R 5%	220R 5%	120R 5%	220R 5%	120R 5%
3468	220R 5%	150R 5%	150R 5%	150R 5%	150R 5%	220R 5%	150R 5%	150R 5%	220R 5%	220R 5%	150R 5%	220R 5%	150R 5%
3471	-	2R7 1%	2R4 1%	2R4 1%	2R2 1%	1R8 1%	2R2 1%	2R4 1%	-	2R2 1%	2R7 1%	1R8 1%	1R8 1%
3472	3R3 1%	2R4 1%	2R4 1%	2R7 1%	2R2 1%	3R3 1%	2R 1%	2R4 1%	3R3 1%	3R3 1%	2R4 1%	3R3 1%	2R2 1%
3473	390K 5%	680K 5%	820K 5%	820K 5%	820K 5%	820K 5%	680K 5%	820K 5%	390K 5%	1M 5%	680K 5%	820K 5%	1M 5%
3474	15K 5%	12K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	12K 5%	15K 5%	15K 5%
3481	5R6 5%	5R6 5%	10R 5%	2R7 5%	5R6 5%	4R7 5%	-	-	5R6 5%	-	5R6 5%	4R7 5%	
3482	22K 1%	22K 1%	2K4 1%	22K 1%	22K 1%	22K 1%	-	-	22K 1%	-	22K 1%	22K 1%	
3483	56K 1%	56K 1%	5K6 1%	56K 1%	56K 1%	56K 1%	-	-	56K 1%	-	56K 1%	56K 1%	-
3491	100K 5%	100K 5%	100K 5%	82K 5%	68K 5%	82K 5%	100K 5%	100K 5%	100K 5%	82K 5%	100K 5%	82K 5%	82K 5%
3494	180K 5%	-	100K 5%	150K 5%	680K 5%	680K 5%	-	-	180K 5%	-	-	680K 5%	-
3499	680K 5%	680K 5%	680K 5%	330K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%
5401	50uH	42uH	33uH	33uH	25uH	42uH	33uH	37uH	50uH	16uH	42uH	42uH	25uH
5408	-	SC2132 9-00B	CU15	CU15	CU15	SC2132 9-00B	CU15	CU15	-	SC2132 9-00B	SC2132 9-00B	SC2132 9-00B	CU15
5450	JF0501-21835B	JF0501-85021B	JF0501-21836B	JF0501-21140B	JF0101-85020B	JF0101-85021B	JF0501-21835B	JF0501-2153B	JF0501-21835B	JF0501-21133B	JF0501-85021B	JF0101-85021B	JF0501-2136B
5451	27uH 10%	JMP	33uH 10%	27uH 10%	JMP	JMP	33uH 10%	27uH 10%	27uH 10%	39uH 10%	JMP	JMP	27uH 10%
6404	DVM1500M	-	DVM1500M	DVM1500M	DVM1500M	-	DVM1500M	DVM1500M	DVM1500M	-	-	-	DMV1500M
6411	-	BY229X-800	-	-	-	BY229X-800	-	-	-	BY229X-80	BY229X-80	BY229X-800	-
6412	-	BY359X-1500	-	-	-	BY359X-1500	-	-	-	BY359X-1500	BY359X-1500	BY359X-1500	-
7405	BU4508DX	BU2725DX	BU4508DX	BU2725DX	BU4508DX	BU2725DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU2725DX	BU2725DX	BU4508DX
9407	-	-	JMP	JMP	JMP	-	JMP	JMP	-	-	-	-	JMP
9417	-	JMP	-	-	-	JMP	-	-	-	JMP	JMP	JMP	-

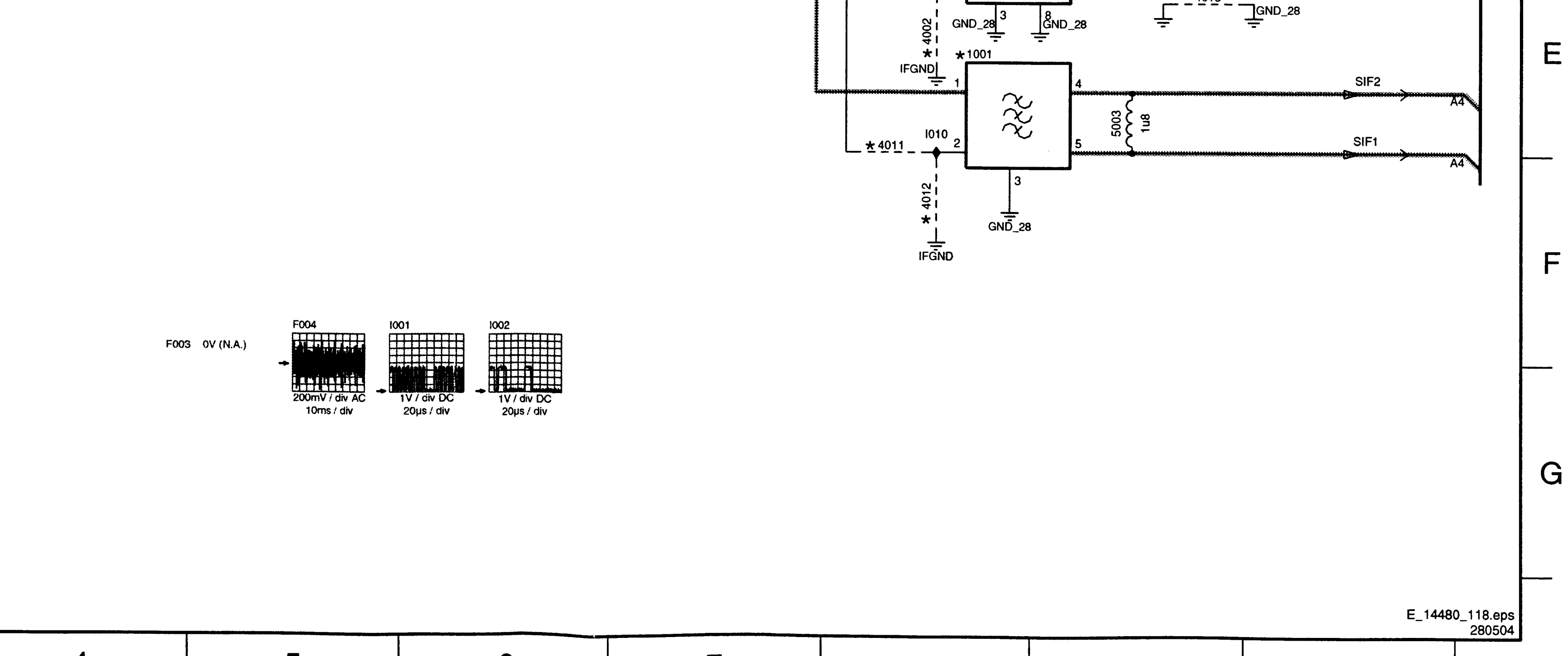
Region	AP					CHINA				INDIA		
Tube	CPT	LPD	LPD	LPD	LPD	LPD	LPD	LPD	LPD	CPD	LPD	SMGK
Size	21RF	25RF	29RF	32WR	34RF	25RF	21RF	29RF	34RF	21RF	29RF	29FSQ
2411	220pF	680nF	1.2nF	330pF	1nF	680nF	220pF	1.2nF	1nF	220pF	1.2nF	680pF
2412	8n2	15nF	15nF	13nF	12nF	15nF	8n2	15nF	12nF	8n2	15nF	13nF
2413	68nF	33nF	33nF	18nF	33nF	33nF	68nF	33nF	33nF	68nF	33nF	39nF
2416	-	-	3n3	-	-	-	-	3n3	-	-	3n3	-
2418	220nF	360nF	330nF	-	300nF	360nF	270nF	330nF	300nF	220nF	330nF	390nF
2419	-	2u2	2u2	430nF	2u2	2u2	-	2u2	2u2	-	2u2	2u2
2425	-	33nF	33nF	33nF	10nF	33nF	-	33nF	10nF	-	33nF	33nF
2451	120nF	120nF	220nF	180nF	270nF	120nF	220nF	220nF	270nF	120nF	220nF	220nF
2457	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7
2487	1nF	1n5	1nF	1n5	3n3	1n5	1nF	1nF	3n3	1nF	1nF	1nF
2490	-	-	-	-	-	-	-	-	-	-	-	-
3224	1M 5%	680K 5%	680K 5%	680K 5%	1M 5%	680K 5%	1M 5%	680K 5%	1M 5%	1M 5%	680K 5%	1M 5%
3295	2K7 5%	8K2 5%	10K 5%	8K2 5%	7K5 1%	8K2 5%	8K2 5%	10K 5%	7K5 1%	2K7 5%	10K 5%	8K2 5%
3414	10R 1W 5%	1R 1W 5%	1R 1W 5%	6R8 1W 5%	6R8 1W 5%	1R 1W 5%	4R7 1W 5%	1R 1W 5%	6R8 1W 5%	10R 1W 5%	1R 1W 5%	4R7 1W 5%
3431	82K 1%	82K 1%	82K 1%	82K 1%	10K 1%	82K 1%	82K 1%	82K 1%	10K 1%	82K 1%	82K 1%	82K 1%
3451	82K 1%	68K 1%	68K 1%	82K 1%	68K 1%	68K 1%	68K 1%	68K 1%	68K 1%	82K 1%	68K 1%	56K 1%
3452	18K 5%	18K 5%	15K 5%	6K8 5%	18K 5%	18K 5%	18K 5%	15K 5%	18K 5%	18K 5%	15K 5%	18K 5%
3453	33K 5%	33K 5%	33K 5%	22K 5%	33K 5%	33K 5%	33K 5%	33K 5%	33K 5%	33K 5%	33K 5%	33K 5%
3467	220R 5%	120R 5%	120R 5%	220R 5%	150R 5%	120R 5%	220R 5%	120R 5%	150R 5%	220R 5%	120R 5%	220R 5%
3468	220R 5%	150R 5%	150R 5%	220R 5%	150R 5%	150R 5%	220R 5%	150R 5%	150R 5%	220R 5%	150R 5%	220R 5%
3471	2R2 1%	2R4 1%	2R4 1%	1R8 1%	2R2 1%	2R4 1%	3R9 1%	2R4 1%	2R2 1%	2R2 1%	2R4 1%	2R2 1%
3472	3R9 1%	2R4 1%	2R4 1%	3R3 1%	2R2 1%	2R4 1%	4R7 1%	2R4 1%	2R2 1%	3R9 1%	2R4 1%	2R2 1%
3473	390K 5%	820K 5%	680K 5%	820K 5%	430K 5%	820K 5%	680K 5%	680K 5%	430K 5%	390K 5%	680K 5%	680K 5%
3474	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%
3481	-	-	-	4R7 5%	-		-	-	-	-	-	-
3482	-	-	-	22K 1%	-		-	-	-	-	-	-
3483	-	-	-	56K 1%	-	-	-	-	-	-	-	-
3491	82K 5%	100K 5%	82K 5%	82K 5%	82K 5%	100K 5%	56K 5%	82K 5%	82K 5%	82K 5%	82K 5%	56K 5%
3494	-	-	-	680K 1%	-	-	-	-	-	-	-	-
3499	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%
5401	82uH	37uH	33uH	42uH	42uH	-	82uH	33uH	42uH	82uH	33uH	33uH
5408	-	CU15	CU15	SC2132 9-00B	CU15	CU15	-	CU15	CU15	-	CU15	CU15
5450	JF0501-2135B	JF0501-2135B	JF0501-2136B	JF0101-85021B	JF0501-2601B	JF0501-2135B	JF0501-2135B	JF0501-2136B	JF0501-2601B	JF0501-2135B	JF0501-2136B	JF0501-2133B
5451	68uH 5%	27uH 10%	27uH 10%	0.58mm COL	22uH	27uH 10%	68uH 5%	27uH 10%	22uH	68uH 5%	27uH 10%	22uH 10%
6404	DVM1500M	DVM1500M	DVM1500M	-	DVM1500M	DVM1500M	DVM1500M	DVM1500M	DVM1500M	DVM1500M	DVM1500M	DVM1500M
6411	-	-	-	BY229X-800	-	-	-	-	-	-	-	-
6412	-	-	-	BY359X-1500	-	-	-	-	-	-	-	-
7405	BU4508DX	BU4508DX	BU4508DX	BU2725DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX
9407	-	JMP	JMP	-	JMP	JMP	-	JMP	JMP	-	JMP	JMP
9417	-	-	-	JMP	-	-	-	-	-	-	-	-

Region	EUROPE							
Tube	LPD	LPD	LPD	LPD	LPD	LPD	LPD	LPD
Size	21RF	24 WR	25 I	28 I	29 RF	28 WR	28 WS	32 WR
2411	470pF	1n2	470pF	470pF	1nF	680pF	680pF	680pF
2412	8n2	13nF	9n1	9n1	13nF	11nF	11nF	11nF
2413	33nF	15nF	18nF	18nF	33nF	15nF	15nF	15nF
2416	-	2n2	-	-	-	4n7	2n2	4n7
2418	470nF	-	390nF	390nF	360nF	-	-	-
2419	2u2	470nF	470nF	470nF	2u2	430nF	470nF	430nF
2425	33nF	33nF	33nF	33nF	33nF	33nF	33nF	33nF
2451	220nF	220nF	220nF	220nF	220nF	220nF	220nF	220nF
2457	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7
2487	1nF	1nF	1nF	1nF	1nF	1nF	1nF	1nF
2490	47n	-	-	-	-	-	-	-
3224	1M 5%	1M 5%	1M 5%	1M 5%	1M 5%	1M 5%	1M 5%	1M 5%
3295	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%
3414	4R7 1W	4R7 1W	10R 1W 5%	10R 1W 5%	2R2 1W	3R3 1W	4R7 1W	3R3 1W
3431	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	68K 1%
3451	68K 1%	56K 1%	120K 5%	120K 5%	68K 1%	68K 1%	68K 1%	18K 5%
3452	18K 5%	18K 5%	18K 5%	18K 5%	18K 5%	18K 5%	18K 5%	220R 5%
3453	22K 5%	22K 5%	33K 5%	33K 5%	33K 5%	22K 5%	22K 5%	220R 5%
3467	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	1R5 1%
3468	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	6R8 1%
3471	3R3 1%	3R3 5%	1R5 1%	1R5 1%	2R2 1%	1R5 1%	3R3 1%	470K 5%
3472	3R3 1%	3R3 1%	2R2 1%	2R2 1%	2R2 1%	6R8 1%	3R3 1%	15K 5%
3473	470K 5%	470K 5%	680K 5%	680K 5%	680K 5%	470K 5%	470K 5%	-
3474	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	-
3481	-	-	-	-	-	-	-	-
3482	-	-	-	-	-	-	-	56K 5%
3483	-	-	-	-	-	-	-	56K 5%
3491	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	-
3494	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	680K 5%
3499	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%
5401	82uH	37uH	50uH	50uH	25uH	50uH	25uH	25uH
5408	CU15	SC21329-00B	SC21329-00B	SC21329-00B	CU15	SC21329-00B	SC21329-00B	SC21329-00B
5450	1342.0033CY	1342.0048B	1342.0048B	1342.0048B	1362.0016AB	1362-0015AB	1342.0042CY	1362-0015AB
5451	22uH 10%	22uH 10%	27uH 10%	27uH 10%	39uH 10%	0.588 COL	22uH 10%	33uH 10%
6404	DVM1500M	-	-	-	DVM1500M	-	-	-
6411	-	BY229X-800	BY229X-800	BY229X-800	-	BY229X-800	BY229X-800	BY229X-800
6412	-	BY359X-1500	BY359X-1500	BY359X-1500	-	BY359X-1500	BY359X-1500	BY359X-1500
7405	BU4508DX	BU2725DX	BU2725DX	BU2725DX	BU4508DX	BU2725DX	BU4508DX	BU2725DX
9407	JMP	-	-	-	JMP	-	-	-
9417	-	JMP	-	-	-	JMP	JMP	JMP

3139 123 5676.1

Mono Carrier: Tuner IF


A3
TUNER IF
*1000
TV TUNER
MT
NC
AS SCL SDA +5 ADC
FOR ITV ONLY
1010
FOR EMC ONLY
1011
TO 0282 OF
A1
POWER SUPPLY
F005
F001
I016
F002
34V5
VT_Supply
F003
F004
SCL
SDA
A4
I014 F007
I015 F008
4000
3000
RES
4001
3001
RES
I001
I002
4.3V
4.9V
1005
For Compair only
F011
2001
RES 2002
2003
4003
5002
2004 47n
2005 10u 50V
6001 BZX79-C33
2006 470u
2007 100n
3003 1K5
2008
6002
BAS316
6003
3002
*4006
3004 RES
I011
3005 100R
F006
RF_AGC
+5V +5VSVbuffer
9002
5001
4005 RES
6006 BZX79-B8V2
3020 220R
I013
1004
FOR DVD ONLY
for ATSC
1012
2009
3016
3014
I004
2016
F010
SSIF
5V
*7003
4010 RES 3010
I003
2014
I007
1V1
3019
0V3
I012
3018
2013
+5V
3009
6004
I006
7001 PDTC124ET
5V
0V
IFGND
SEL_LLP|M
I017 F009
3006
I005
3008
I008
*1002
VIF1
VIF2
I009
GND_28
TO 1510 OF
1013
A1
(For Lightning Protection)


3007
IFGND
*1003
SWI
IN
ING
GND
O1
O2
*4004
4002
IFGND
GND_28
for EMC
4013
GND_28
*1001
SIF2
SIF1
5003 1u8
I010
*4011
4012
IFGND
GND_28
F003 0V (N.A.)
F004
200mV / div AC 10ms / div
I001
1V / div DC 20µs / div
I002
1V / div DC 20µs / div

ITEM	EU Normal	EU FM Radio	EU Splitter	NA/LA/AP NTSC	AP LNA	AP Splitter	CH LNA
1000	UV1316E/A I-4	UR1316/A I-3	TEDE9-703A	TEDH9-305A	UV1356A/A I G-3	TEDE9-703A	UV1356A/A I G-3
2002	50V 22P	50V 22P	50V 22P	---	50V 22P	50V 22P	50V 22P
2008	68u	68u	68u	100u	100u	68u	100u
2009	---	16V 100N	---	---	---	---	---
2013	---	25V 1N	---	---	---	---	---
2014	---	25V 1N	---	---	---	---	---
2016	---	25V 1N	---	---	---	---	---
3010	---	330R	---	---	---	---	---
3014	---	820R	---	---	---	---	---
3016	---	100K	---	---	---	---	---
3018	---	560R	---	---	---	---	---
3019	---	150K	---	---	---	---	---
5002	0U47	0U47	0U47	0U39	0U39	0U47	0U39
7003	---	BFS20	---	---	---	---	---

ITEM	EU-QSS	NA/LA/AP INT	AP QSS	CH QSS
1001	K9656M	---	K9362M	K9352M
1002	K3953M	M1971M	K7257M	---
1003	---	---	---	K6274M
2003	50V 10N	---	50V 10N	50V 10N
3002	10K	---	---	---
3006	10K	---	10K	10K
3007	2K2	---	2K2	2K2
3008	6K8	---	6K8	6K8
3009	2K2	---	2K2	2K2
4002	JMP	JMP	---	JMP
4003	---	JMP	---	---
4004	---	---	JMP	---
4006	---	JMP	JMP	JMP
4011	JMP	---	---	---
4012	---	---	JMP	JMP
6002	BAS316	---	---	---
6004	1SS356	---	1SS356	1SS356
7001	PDTC124ET	---	PDTC124ET	PDTC124ET

3139 123 5676.1

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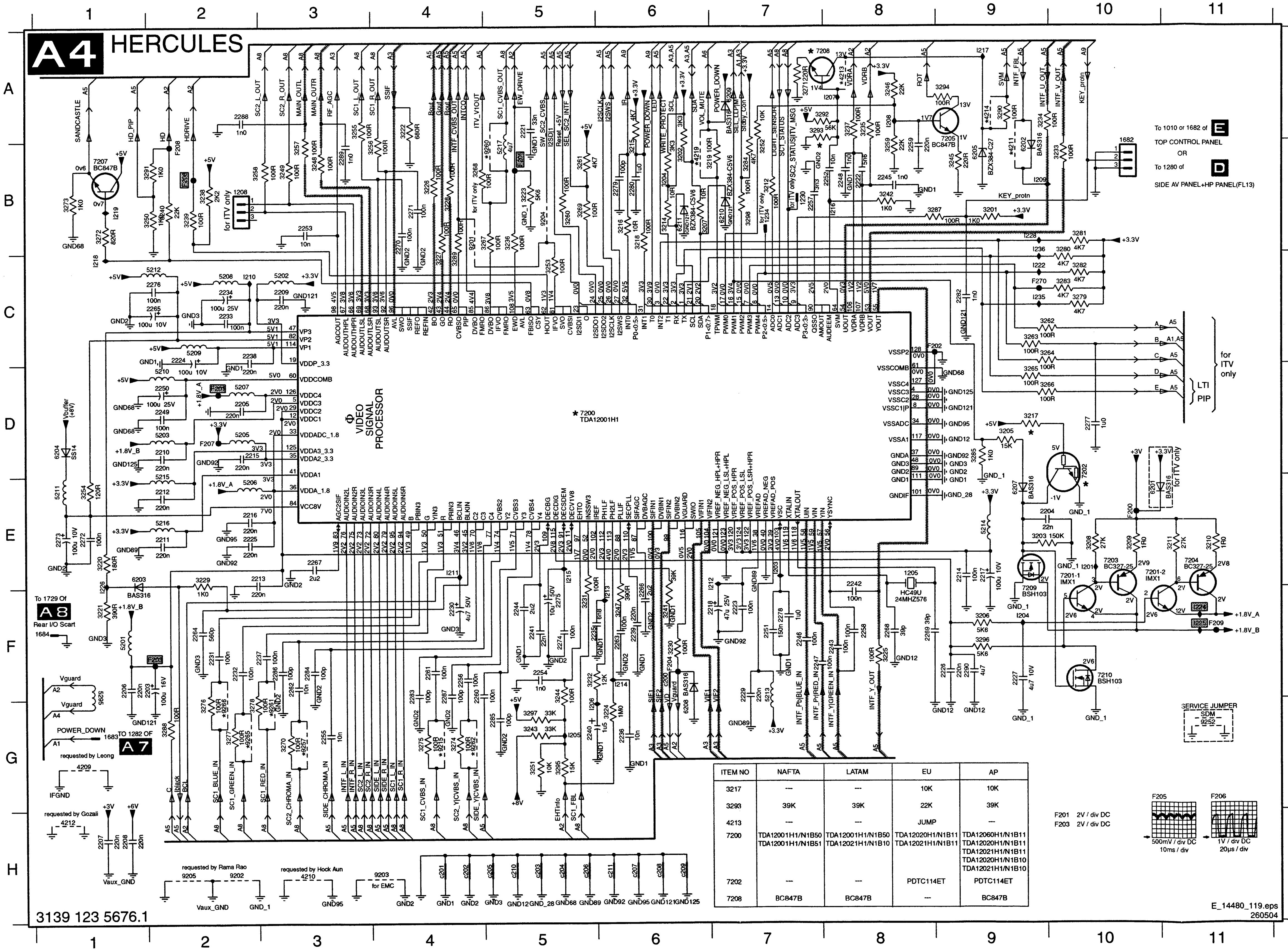
280504

1000	A4
1001	E8
1002	D8
1003	D8
1004	A10
1005	C3
1010	A3
1011	B3
1012	C10
1013	D10
2001	C4
2002	C4
2003	B5
2004	B6
2005	A6
2006	A6
2007	A7
2008	B6
2009	C9
2013	C9
2014	C8
2016	C9
3000	B4
3001	B4
3002	B7
3003	A7
3004	B7
3005	B8
3006	D4
3007	D7
3008	C7
3009	C5
3010	C8
3014	C9
3016	C9
3018	C9
3019	C9
3020	A9
4000	B4
4001	B4
4002	E8
4003	B6
4004	E8
4005	A8
4006	B7
4010	C8
4011	E8
4012	F8
4013	E9
5001	A8
5002	B6
5003	E9
6001	B6
6002	B7
6003	B7
6004	C5
6006	A9
7001	D4
7003	C9
9002	A9
F001	A5
F002	A5
F003	A5
F004	B5
F005	A4
F006	B9
F007	B3
F008	B3
F009	D3
F010	C10
F011	C3
I001	B4
I002	B4
I003	C8
I004	C9
I005	D4
I006	D6
I007	C9
I008	D7
I009	D8
I010	E8
I011	B7
I012	C9
I013	A9
I014	B3
I015	B3
I016	A6
I017	D3

Mono Carrier: Hercules


A4 HERCULES
7200 TDA12001H1
VIDEO SIGNAL PROCESSOR
To 1010 or 1682 of E TOP CONTROL PANEL
OR
To 1280 of D SIDE AV PANEL+HP PANEL(FL13)
for ITV only
LTI PIP
To 1729 Of A8 Rear I/O Scart
TO 1282 OF A7
requested by Leong
requested by Gozali
requested by Rama Rao
requested by Hock Aun
for EMC
SERVICE JUMPER SDM 9252
F201 2V / div DC
F203 2V / div DC
F205 500mV / div DC 10ms / div
F206 1V / div DC 20µs / div
3139 123 5676.1
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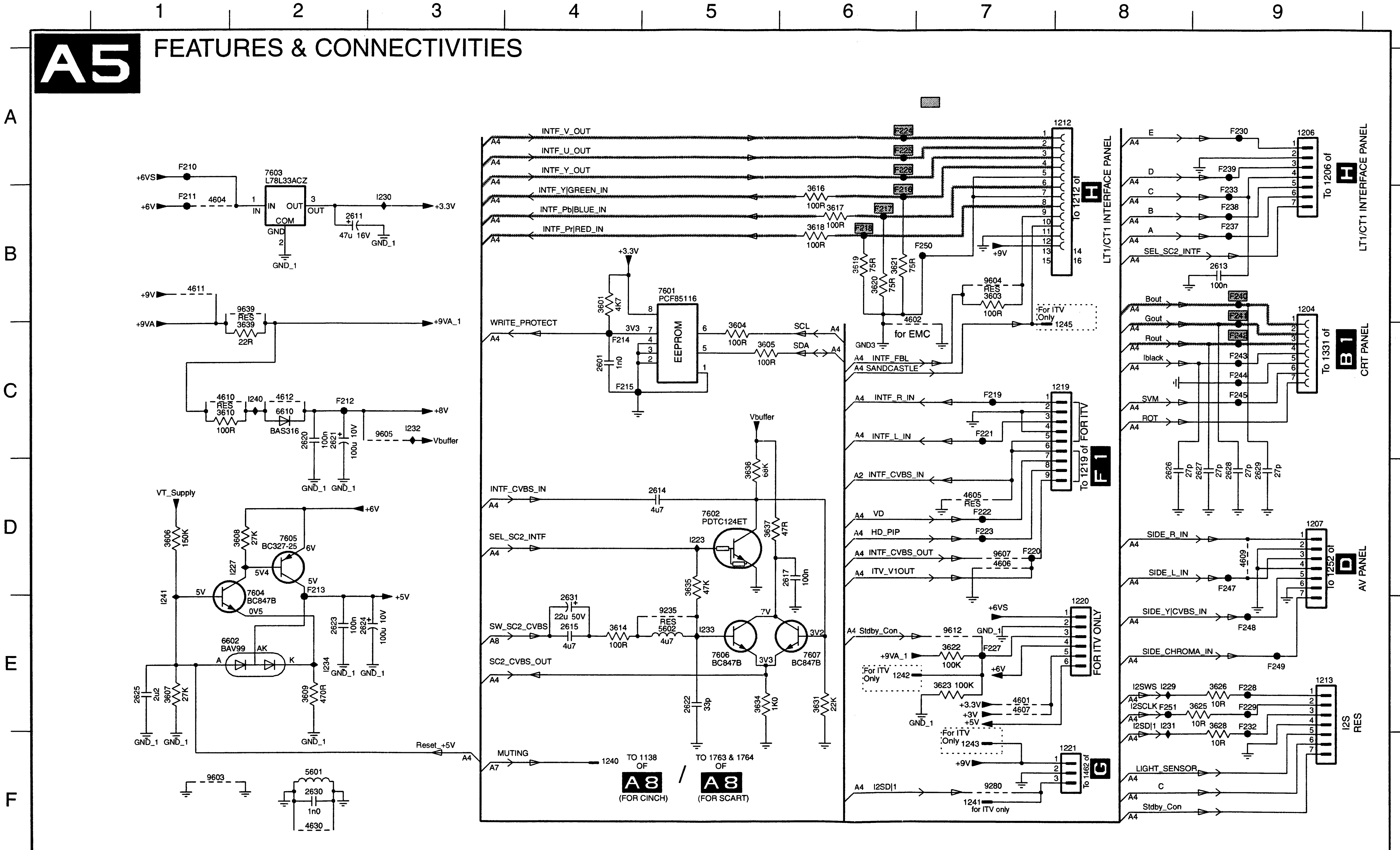
260504

ITEM NO	NAFTA	LATAM	EU	AP
3217	---	---	10K	10K
3293	39K	39K	22K	39K
4213	---	---	JUMP	---
7200	TDA12001H1/N1B50 TDA12001H1/N1B51	TDA12001H1/N1B50 TDA12021H1/N1B10	TDA12020H1/N1B11 TDA12021H1/N1B11	TDA12060H1/N1B11 TDA12020H1/N1B11 TDA12021H1/N1B11 TDA12020H1/N1B10 TDA12021H1/N1B10
7202	---	---	PDTC114ET	PDTC114ET
7208	BC847B	BC847B	---	BC847B

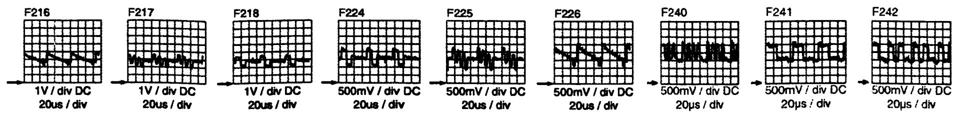
1205 E8
1208 B2
1230 B7
1234 B7
1682 B10
1683 G1
1684 F1
2203 F2
2204 E9
2205 D2
2206 F1
2207 H1
2208 H1
2209 C3
2210 D2
2211 E2
2212 E2
2213 E2
2214 E9
2215 D2
2216 E2
2217 E9
2218 F7
2221 A5
2222 B8
2223 F7
2224 C2
2225 E2
2226 F9
2227 F9
2229 F7
2230 F4
2231 F2
2232 F2
2233 C2
2234 C2
2235 F5
2236 G6
2237 F3
2238 C2
2239 F6
2240 G5
2241 F5
2242 E8
2243 F8
2244 F5
2245 B8
2246 F7
2247 F7
2248 B8
2249 D2
2250 D2
2251 F7
2252 B8
2253 B3
2254 F5
2255 G3
2256 F4
2257 B7
2258 F8
2259 B8
2260 F4
2261 F4
2262 F3
2263 F6
2264 F2
2265 C2
2266 F6
2267 E3
2268 F8
2269 F8
2270 B4
2271 B4
2272 E1
2273 E1
2274 F5
2275 F5
2276 C2
2277 D10
2278 F7
2279 B6
2280 B6
2282 C9
2283 F4
2284 F3
2285 G5
2286 F3
2287 F4
2288 A2
2289 B3
2290 F9
3201 B9
3202 B6
3203 E9
3204 B6
3205 D9
3206 F9
3207 B6
3208 E10
3209 E10
3210 E11
3211 E11
3212 B7
3214 B6
3215 B6
3216 B6
3217 D9
3218 B6
3219 B7
3220 E1
3221 F1
3222 A4
3223 B5
3224 G6
3225 F8
3226 B4
3227 C4
3228 B4
3229 E2
3230 F6
3231 F5
3232 F5
3233 B10
3234 A9
3235 A8
3236 B5
3237 A8
3238 B2
3239 B2
3240 B2
3241 F6
3242 B8
3243 G5
3244 F5
3245 B9
3246 A8
3247 F6
3248 B3
3249 B3
3250 B2
3251 G5
3252 B7
3253 C5
3254 E1
3255 A3
3256 B4
3257 B3
3258 B2
3259 B8
3260 B5
3261 B5
3262 C9
3263 C9
3264 C9
3265 D9
3266 D9
3267 B5
3268 B4
3269 B5
3270 G3
3271 A7
3272 B1
3273 B1
3274 G4
3275 G4
3276 G2
3277 G2
3278 G2
3279 C10
3280 C10
3281 B10
3282 C10
3283 C10
3284 B7
3285 D9
3287 B8
3288 G2
3289 C4
3290 A9
3291 B2
3292 A7
3293 A7
3294 A9
3295 G5
3296 F9
3297 G5
3298 B7
4209 G1
4210 H3
4211 B9
4212 H1
4213 A8
4214 A9
4219 B6
5201 F1
5202 C3
5203 D2
5205 D2
5206 E2
5207 D2
5208 C2
5209 C2
5210 D2
5211 E1
5212 C2
5213 F7
5214 E9
5215 E2
5216 E2
5217 B5
5295 F1
6201 E10
6202 B9
6203 E1
6204 D1
6205 B9
6207 E9
6208 G6
6209 A7
6210 B7
6211 B6
7200 D5
7201-1 E10
7201-2 E10
7202 D10
7203 E10
7204 E11
7205 B9
7207 B1
7208 A8
7209 F9
7210 F10
9201 B4
9202 H2
9203 H4
9204 B5
9205 H2
9215 G4
9257 G3
9260 B5
9261 G3
9262 G4
9265 G2
9266 G2
F200 E10
F201 D2
F202 C8
F203 F2
F204 F6
F205 B5
F206 B2
F207 D2
F208 B2
F209 F11
F270 C9
I201 E10
I203 E7
I204 F9
I205 G5
I206 G5
I207 A8
I208 A8
I209 B9
I210 C2
I211 E4
I212 E7
I213 F6
I214 F6
I215 E5
I216 B8
I217 A9
I218 C1
I219 B1
I222 C9
I224 F11
I225 F11
I226 E1
I228 B9
I235 C9
I236 B9
c200 F6
c201 H4
c202 H4
c203 H5
c204 H5
c205 H5
c206 H5
c207 H6
c208 H6
c209 H6
c210 H5
c211 H6

Mono Carrier: Features & Connectivities


1 2 3 4 5 6 7 8 9
A B C D E F G
A5
FEATURES & CONNECTIVITIES
+6VS
F210
+6V
F211
4604
7603
L78L33ACZ
IN
OUT
COM
GND
GND_1
I230
2611
47u 16V
+3.3V
+9V
4611
+9VA
9639
RES
3639
22R
+9VA_1
4610
RES
3610
100R
I240
4612
6610
BAS316
F212
+8V
2620
100n
2621
100u 10V
9605
I232
Vbuffer
VT_Supply
3606
150K
3608
27K
7605
BC327-25
6V
5V4
I227
5V
7604
BC847B
0V5
F213
+5V
2623
100n
2624
100u 10V
1241
6602
BAV99
A
AK
K
I234
2625
2u2
3607
27K
3609
470R
Reset_+5V
9603
5601
2630
1n0
4630
+3.3V
3601
4K7
7601
PCF85116
EEPROM
WRITE_PROTECT
3V3
F214
2601
1n0
F215
3604
100R
3605
100R
SCL
SDA
A4
INTF_V_OUT
INTF_U_OUT
INTF_Y_OUT
INTF_Y|GREEN_IN
INTF_Pb|BLUE_IN
INTF_Pr|RED_IN
F224
F225
F226
F217
F216
F218
3616
100R
3617
100R
3618
100R
3619
75R
3620
75R
3621
75R
F250
1212
To 1212 of
H
LT1/CT1 INTERFACE PANEL
9604
RES
3603
100R
4602
for EMC
GND3
For ITV Only
1245
INTF_FBL
SANDCASTLE
INTF_CVBS_IN
2614
4u7
7602
PDTC124ET
I223
3636
68K
3637
47R
2617
100n
SEL_SC2_INTF
3635
47K
2631
22u 50V
SW_SC2_CVBS
2615
4u7
3614
100R
9235
RES
5602
4u7
I233
7606
BC847B
7607
BC847B
7V
3V2
3V3
SC2_CVBS_OUT
2622
33p
3634
1K0
3631
22K
MUTING
1240
TO 1138 OF
A8
(FOR CINCH)
TO 1763 & 1764 OF
A8
(FOR SCART)
INTF_R_IN
F219
INTF_L_IN
F221
1219
To 1219 of FOR ITV
F1
4605
RES
VD
F222
HD_PIP
F223
INTF_CVBS_OUT
9607
4606
F220
ITV_V1OUT
+6VS
Stdby_Con
9612
GND_1
+9VA_1
3622
100K
F227
For ITV Only
1242
3623 100K
+6V
+3.3V
+3V
+5V
4601
4607
1220
FOR ITV ONLY
For ITV Only
1243
+9V
1221
To 1462 of
G
I2SD|1
9280
1241
for ITV only
E
D
C
B
A
F230
F239
F233
F238
F237
SEL_SC2_INTF
2613
100n
1206
To 1206 of
H
LT1/CT1 INTERFACE PANEL
Bout
Gout
Rout
Iblack
F240
F241
F242
F243
F244
F245
SVM
ROT
1204
To 1331 of
B1
CRT PANEL
2626 27p
2627 27p
2628 27p
2629 27p
SIDE_R_IN
SIDE_L_IN
F247
4609
1207
To 1252 of
D
AV PANEL
SIDE_Y|CVBS_IN
F248
SIDE_CHROMA_IN
F249
I2SWS
I229
3626 10R
F228
I2SCLK
F251
3625 10R
F229
I2SD|1
I231
3628 10R
F232
1213
I2S RES
LIGHT_SENSOR
C
Stdby_Con
E_14480_120.eps
280504

1213	MTV	ITV
1	I2SWS	ITV DATA OUT/SDA
2	I2SCLK	ITV DATAIN
3	I2SDI1	ITV CLOCK
4	GND	GND
5	Light sensor	ITV SCL
6	C	ITV POR 1
7	Stdby-con	Stdby-con

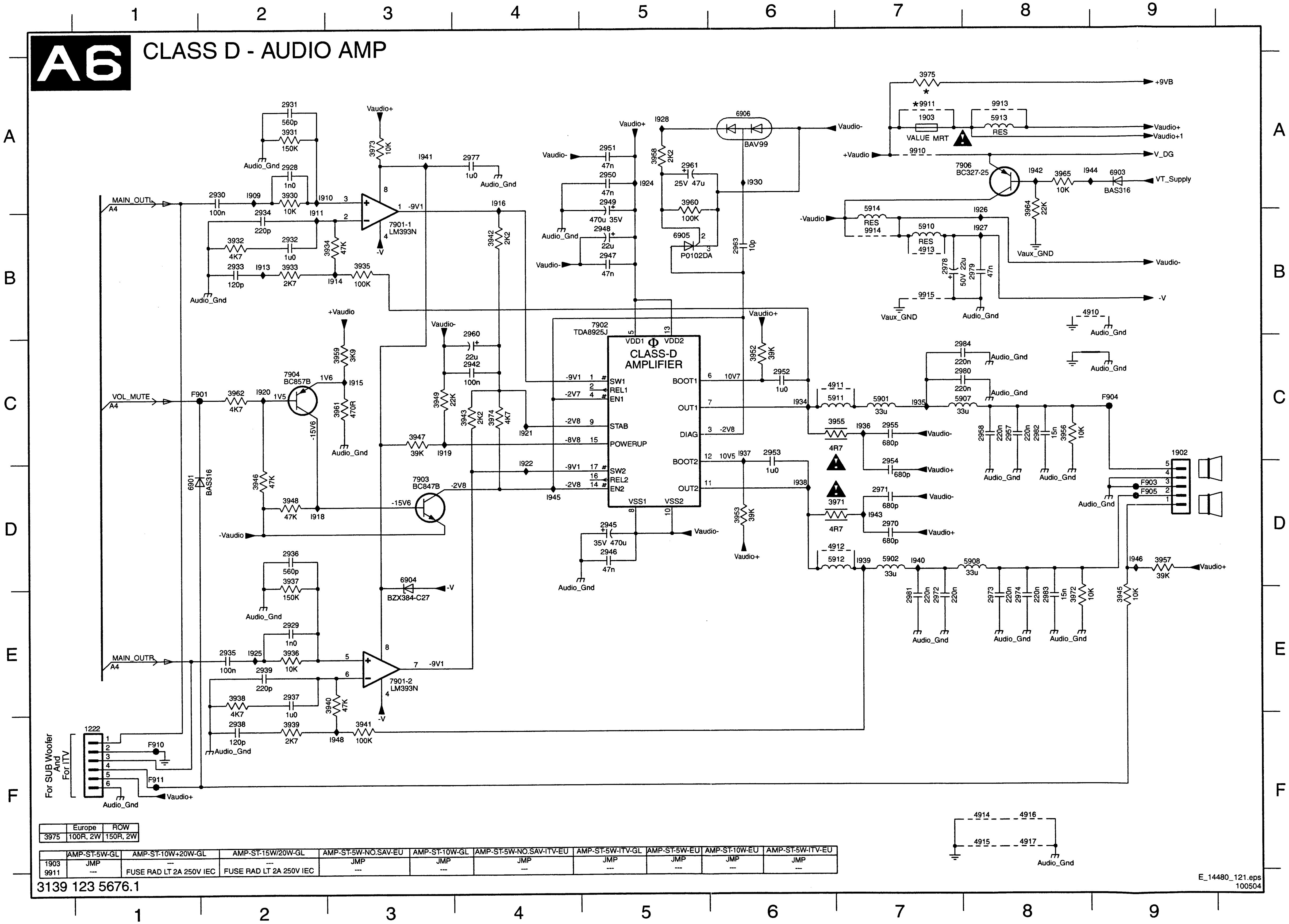
1206	DVD	iDTV	USB	PCMCIA
A	-	-	-	-
B	Power On	Power On	Power On	Power On
C	Bus Request	Bus Request	Bus Request	Bus Request
D	Rx	-	Rx	Rx
E	Tx	-	Tx	Tx



3139 123 5676.1

1204 B9	9639 B2
1206 A9	F210 A1
1207 D9	F211 B1
1212 A7	F212 C2
1213 E9	F213 D2
1219 C8	F214 C4
1220 E8	F215 C4
1221 F8	F216 B6
1240 F4	F217 B6
1241 F7	F218 B6
1242 E6	F219 C7
1243 F7	F220 D7
1245 C8	F221 C7
2601 C4	F222 D7
2611 B2	F223 D7
2613 B9	F224 A6
2614 D5	F225 A6
2615 E4	F226 A6
2617 D6	F227 E7
2620 C2	F228 E9
2621 C2	F229 E9
2622 E5	F230 A9
2623 E2	F232 E9
2624 E3	F233 B9
2625 E1	F237 B9
2626 D8	F238 B9
2627 D9	F239 A9
2628 D9	F240 B9
2629 D9	F241 B9
2630 F2	F242 C9
2631 E4	F243 C9
3601 B4	F244 C9
3603 B7	F245 C9
3604 C5	F247 D9
3605 C5	F248 E9
3606 D1	F249 E9
3607 E1	F250 B7
3608 D2	F251 E8
3609 E2	I223 D5
3610 C1	I227 D2
3614 E4	I229 E8
3616 B6	I230 B3
3617 B6	I231 E8
3618 B6	I232 C3
3619 B6	I233 E5
3620 B6	I234 E2
3621 B6	I240 C2
3622 E7	I241 E1
3623 E7	
3625 E9	
3626 E9	
3628 E9	
3631 E6	
3634 E5	
3635 D5	
3636 D5	
3637 D5	
3639 C2	
4601 E7	
4602 C6	
4604 B1	
4605 D7	
4606 D7	
4607 E7	
4609 D9	
4610 C1	
4611 B1	
4612 C2	
4630 F2	
5601 F2	
5602 E5	
6602 E2	
6610 C2	
7601 B5	
7602 D5	
7603 A2	
7604 E2	
7605 D2	
7606 E5	
7607 E6	
9235 E5	
9280 F7	
9603 F1	
9604 B7	
9605 C3	
9607 D7	
9612 E7	

Mono Carrier: Class D - Audio Amplifier


A6
CLASS D - AUDIO AMP
MAIN_OUTL
MAIN_OUTR
VOL_MUTE
For SUB Woofer And For ITV
1222
F901
F910
F911
Audio_Gnd
Vaudio+
Vaudio-
+Vaudio
-Vaudio
-V
+9VB
Vaudio+1
V_DG
VT_Supply
7901-1 LM393N
7901-2 LM393N
7902 TDA8925J
CLASS-D AMPLIFIER
VDD1
VDD2
VSS1
VSS2
SW1
REL1
EN1
STAB
POWERUP
SW2
REL2
EN2
BOOT1
OUT1
DIAG
BOOT2
OUT2
7903 BC847B
7904 BC857B
7906 BC327-25
6901 BAS316
6903 BAS316
6904 BZX384-C27
6905 P0102DA
6906 BAV99
1903 VALUE MRT
5913 RES
5914 RES
5910 RES
5901 33u
5902 33u
5907 33u
5908 33u
5911
5912
1902
F903
F905
F904
Vaux_GND
1 2 3 4 5 6 7 8 9
A B C D E F

	Europe	ROW
3975	100R, 2W	150R, 2W

	AMP-ST-5W-GL	AMP-ST-10W+20W-GL	AMP-ST-15W/20W-GL	AMP-ST-5W-NO.SAV-EU	AMP-ST-10W-GL	AMP-ST-5W-NO.SAV-ITV-EU	AMP-ST-5W-ITV-GL	AMP-ST-5W-EU	AMP-ST-10W-EU	AMP-ST-5W-ITV-EU
1903	JMP	---	---	JMP	JMP	JMP	JMP	JMP	JMP	JMP
9911	---	FUSE RAD LT 2A 250V IEC	FUSE RAD LT 2A 250V IEC	---	---	---	---	---	---	---

3139 123 5676.1

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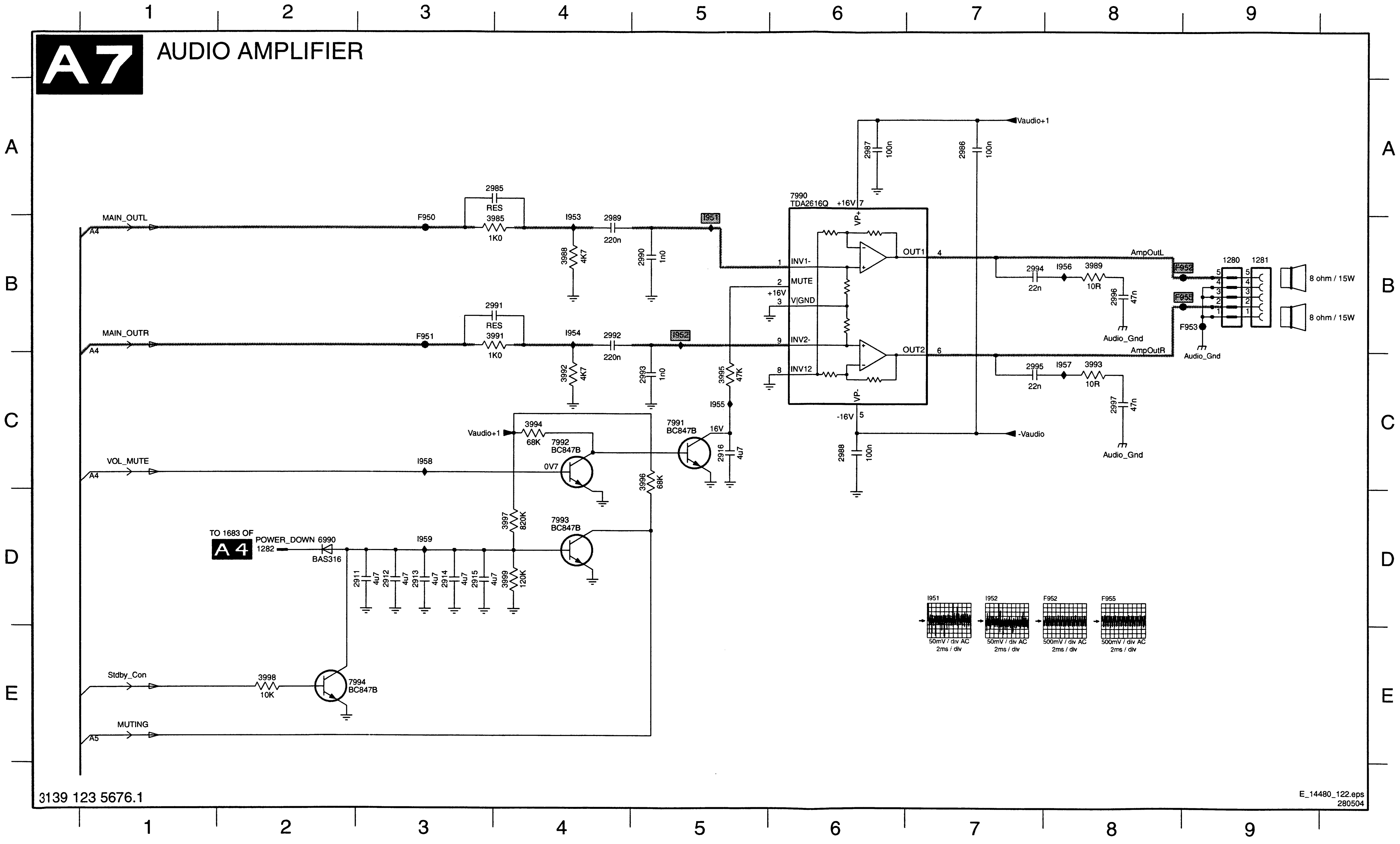
100504

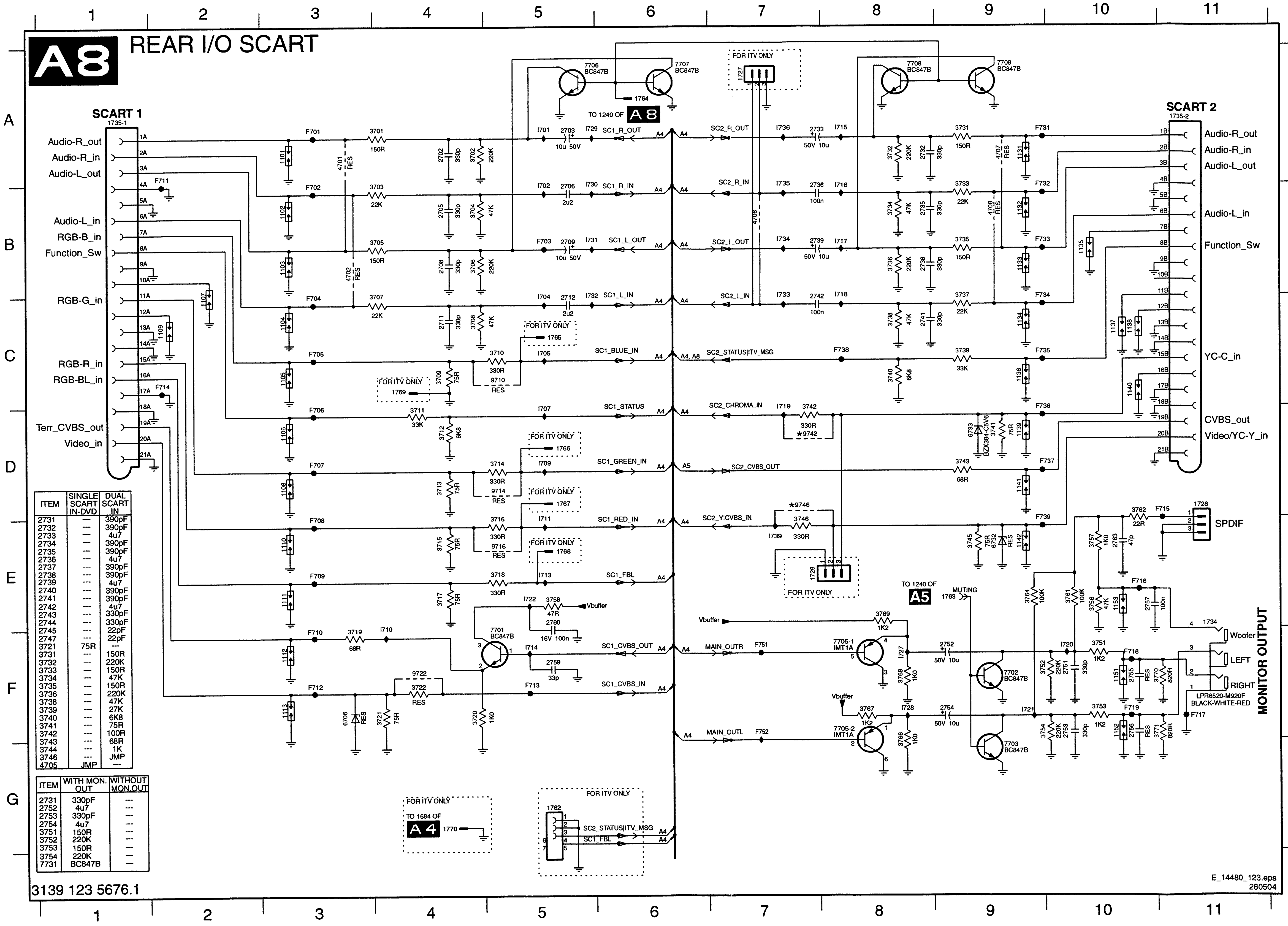
1222	F1
1902	C9
1903	A7
2928	A2
2929	E2
2930	A2
2931	A2
2932	B2
2933	B2
2934	B2
2935	E2
2936	D2
2937	E2
2938	F2
2939	E2
2942	C4
2945	D5
2946	D5
2947	B5
2948	B5
2949	A5
2950	A5
2951	A5
2952	C6
2953	C6
2954	D7
2955	C7
2957	C8
2958	C8
2960	B4
2961	A5
2963	B6
2970	D7
2971	D7
2972	E7
2973	E8
2974	E8
2977	A4
2978	B7
2979	B8
2980	C8
2981	E7
2982	C8
2983	E8
2984	C8
3930	A2
3931	A2
3932	B2
3933	B2
3934	B3
3935	B3
3936	E2
3937	D2
3938	E2
3939	F2
3940	E3
3941	F3
3942	B4
3943	C4
3945	E9
3946	D2
3947	C3
3948	D2
3949	C3
3952	C6
3953	D6
3955	C7
3956	C8
3957	D9
3958	A5
3959	C3
3960	A5
3961	C3
3962	C2
3964	A8
3965	A8
3971	D7
3972	E8
3973	A3
3974	C4
3975	A7
4910	B9
4911	C7
4912	D7
4913	B7
4914	F8
4915	F8
4916	F8
4917	F8
5901	C7
5902	D7
5907	C8
5908	D8
5910	B7
5911	C7
5912	D7
5913	A8
5914	B7
6901	D1
6903	A9
6904	D3
6905	B5
6906	A6
7901-1	B3
7901-2	E3
7902	B5
7903	D3
7904	C2
7906	A8
9910	A7
9911	A7
9913	A8
9914	B7
9915	B7
F901	C2
F903	D9
F904	C9
F905	D9
F910	F1
F911	F1
I909	A2
I910	A3
I911	B2
I913	B2
I914	B3
I915	C3
I916	A4
I918	D2
I919	C3
I920	C2
I921	C4
I922	D4
I924	A5
I925	E2
I926	B8
I927	B8
I928	A5
I930	A6
I934	C6
I935	C7
I936	C7
I937	C6
I938	D6
I939	D7
I940	D7
I941	A3
I942	A8
I943	D7
I944	A9
I945	D4
I946	D9
I948	F3

Mono Carrier: Audio Amplifier


A7
AUDIO AMPLIFIER
MAIN_OUTL
A4
F950
2985
RES
3985
1K0
I953
2989
220n
I951
3988
4K7
2990
1n0
MAIN_OUTR
A4
F951
2991
RES
3991
1K0
I954
2992
220n
I952
3992
4K7
2993
1n0
7990
TDA2616Q
+16V
VP+
INV1-
MUTE
+16V
V|GND
INV2-
INV12
OUT1
OUT2
VP-
-16V
Vaudio+1
2987
100n
2986
100n
-Vaudio
2988
100n
AmpOutL
AmpOutR
2994
22n
I956
3989
10R
2996
47n
Audio_Gnd
2995
22n
I957
3993
10R
2997
47n
F952
F955
F953
1280
1281
8 ohm / 15W
8 ohm / 15W
3995
47K
I955
7991
BC847B
16V
2916
4u7
VOL_MUTE
A4
I958
Vaudio+1
3994
68K
7992
BC847B
0V7
3996
68K
3997
820K
7993
BC847B
TO 1683 OF
A4
POWER_DOWN 6990
1282
BAS316
I959
2911
4u7
2912
4u7
2913
4u7
2914
4u7
2915
4u7
3999
120K
Stdby_Con
3998
10K
7994
BC847B
MUTING
A5
I951
I952
F952
F955
50mV / div AC
2ms / div
50mV / div AC
2ms / div
500mV / div AC
2ms / div
500mV / div AC
2ms / div
3139 123 5676.1
E_14480_122.eps
280504
1 2 3 4 5 6 7 8 9
A B C D E

1280	B9
1281	B9
1282	D2
2911	D3
2912	D3
2913	D3
2914	D3
2915	D3
2916	C5
2985	A4
2986	A7
2987	A6
2988	C6
2989	B4
2990	B5
2991	B4
2992	B4
2993	C5
2994	B7
2995	C7
2996	B8
2997	C8
3985	B4
3988	B4
3989	B8
3991	B4
3992	C4
3993	C8
3994	C4
3995	C5
3996	C5
3997	D4
3998	E2
3999	D4
6990	D2
7990	A6
7991	C5
7992	C4
7993	D4
7994	E2
F950	B3
F951	B3
F952	B9
F953	B9
F955	B9
I951	B5
I952	B5
I953	B4
I954	B4
I955	C5
I956	B8
I957	C8
I958	C3
I959	D3

Mono Carrier: Rear I/O Scart

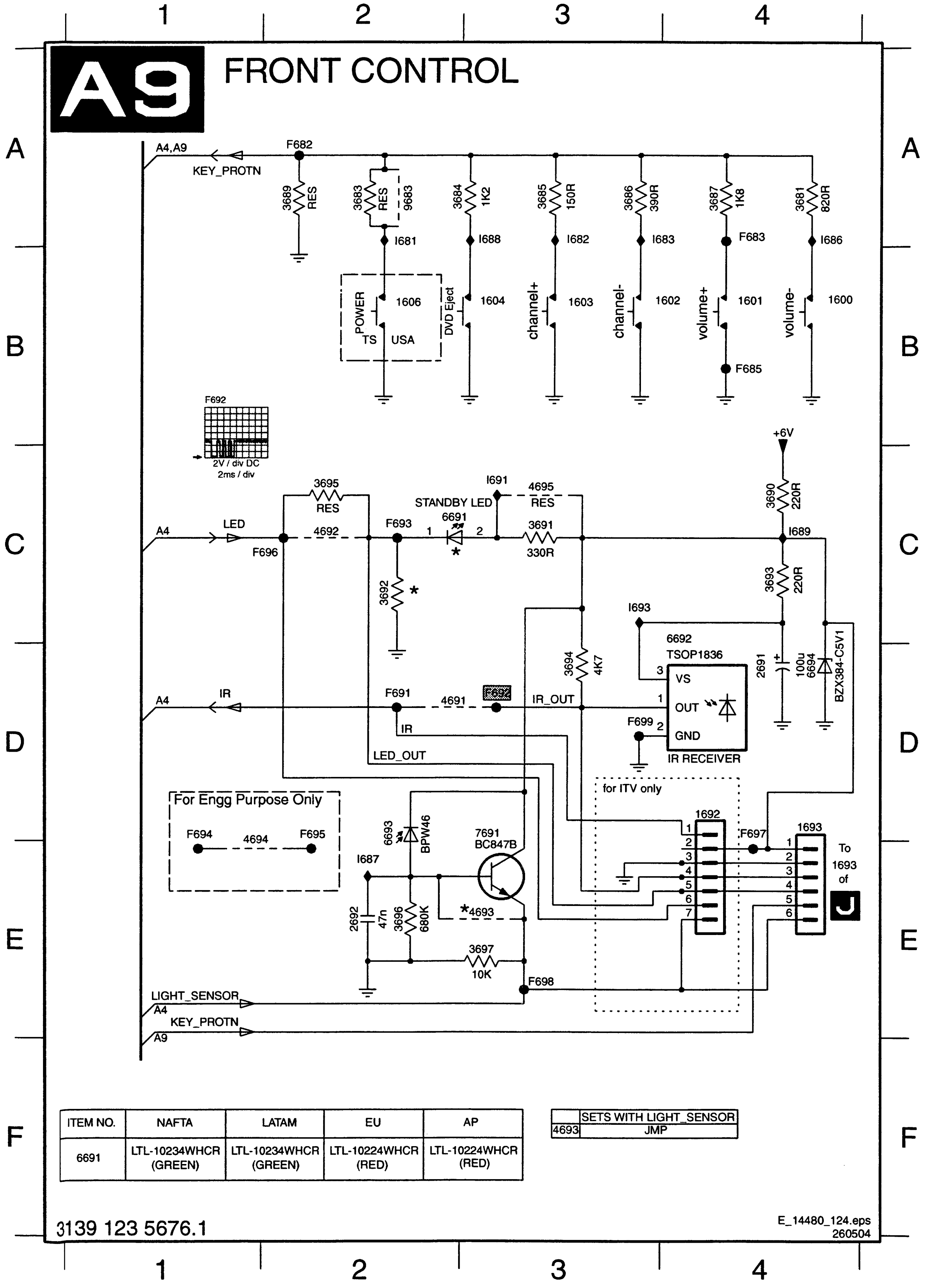

A8
REAR I/O SCART
SCART 1
1735-1
Audio-R_out
Audio-R_in
Audio-L_out
Audio-L_in
RGB-B_in
Function_Sw
RGB-G_in
RGB-R_in
RGB-BL_in
Terr_CVBS_out
Video_in
SCART 2
1735-2
Audio-R_out
Audio-R_in
Audio-L_out
Audio-L_in
Function_Sw
YC-C_in
CVBS_out
Video/YC-Y_in
SPDIF
1728
MONITOR OUTPUT
Woofer
LEFT
RIGHT
LPR6520-M920F
BLACK-WHITE-RED
1734
TO 1240 OF A8
TO 1240 OF A5
MUTING
1763
TO 1684 OF A4
FOR ITV ONLY
7706 BC847B
7707 BC847B
7708 BC847B
7709 BC847B
7701 BC847B
7702 BC847B
7703 BC847B
7705-1 IMT1A
7705-2 IMT1A
SC1_R_OUT
SC1_R_IN
SC1_L_OUT
SC1_L_IN
SC1_BLUE_IN
SC1_STATUS
SC1_GREEN_IN
SC1_RED_IN
SC1_FBL
SC1_CVBS_OUT
SC1_CVBS_IN
SC2_R_OUT
SC2_R_IN
SC2_L_OUT
SC2_L_IN
SC2_STATUS|ITV_MSG
SC2_CHROMA_IN
SC2_CVBS_OUT
SC2_Y|CVBS_IN
MAIN_OUTR
MAIN_OUTL
Vbuffer
1762
A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
10
11
3139 123 5676.1
E_14480_123.eps
260504

ITEM	SINGLE SCART IN-DVD	DUAL SCART IN
2731	---	390pF
2732	---	390pF
2733	---	4u7
2734	---	390pF
2735	---	390pF
2736	---	4u7
2737	---	390pF
2738	---	390pF
2739	---	4u7
2740	---	390pF
2741	---	390pF
2742	---	4u7
2743	---	330pF
2744	---	330pF
2745	---	22pF
2747	---	22pF
3721	75R	---
3731	---	150R
3732	---	220K
3733	---	150R
3734	---	47K
3735	---	150R
3736	---	220K
3738	---	47K
3739	---	27K
3740	---	6K8
3741	---	75R
3742	---	100R
3743	---	68R
3744	---	1K
3746	---	JMP
4705	JMP	---

ITEM	WITH MON. OUT	WITHOUT MON.OUT
2731	330pF	---
2752	4u7	---
2753	330pF	---
2754	4u7	---
3751	150R	---
3752	220K	---
3753	150R	---
3754	220K	---
7731	BC847B	---

1101	A3
1102	B3
1103	B3
1104	C3
1105	C3
1106	D3
1107	C2
1108	D3
1109	C2
1110	E3
1111	E3
1112	F3
1113	F3
1131	A9
1132	B9
1133	B9
1134	C9
1135	B10
1136	C9
1137	C10
1138	C10
1139	D9
1140	C10
1141	D9
1142	E9
1151	F10
1152	F10
1153	E10
1727	A7
1728	D11
1729	E7
1734	E11
1735-1	A1
1735-2	A11
1762	G5
1763	E9
1764	A6
1765	C5
1766	D5
1767	D5
1768	E5
1769	C4
1770	G4
2702	A4
2703	A5
2705	B4
2706	B5
2708	B4
2709	B5
2711	C4
2712	C5
2732	A8
2733	A7
2735	B8
2736	B7
2738	B8
2739	B7
2741	C8
2742	C7
2751	F10
2752	F9
2753	F10
2754	F9
2755	F10
2756	F10
2757	E10
2759	F5
2760	E5
2763	E10
3701	A4
3702	A4
3703	B4
3704	B4
3705	B4
3706	B4
3707	C4
3708	C4
3709	C4
3710	C5
3711	D4
3712	D4
3713	D4
3714	D5
3715	E4
3716	E5
3717	E4
3718	E5
3719	F3
3720	F4
3721	F4
3722	F4
3731	A9
3732	A8
3733	B9
3734	B8
3735	B9
3736	B8
3737	C9
3738	C8
3739	C9
3740	C8
3741	D9
3742	D7
3743	D9
3745	E9
3746	E7
3751	F10
3752	F9
3753	F10
3754	F9
3756	E10
3757	E10
3758	E5
3761	E10
3762	D10
3764	E9
3766	G8
3767	F8
3768	F8
3769	E8
3770	F11
3771	F11
4701	A3
4702	B3
4706	B7
4707	A9
4708	B9
6706	F3
6732	E9
6733	D9
7701	F5
7702	F9
7703	G9
7705-1	F8
7705-2	F8
7706	A6
7707	A6
7708	A8
7709	A9
9710	C5
9714	D5
9716	E5
9722	F4
9742	D7
9746	D7
F701	A3
F702	B3
F703	B5
F704	C3
F705	C3
F706	D3
F707	D3
F708	E3
F709	E3
F710	F3
F711	A2
F712	F3
F713	F5
F714	C2
F715	D11
F716	E10
F717	F11
F718	F10
F719	F10
F731	A9
F732	B9
F733	B9
F734	C9
F735	C9
F736	D9
F737	D10
F738	C8
F739	E9
F751	F7
F752	F7
I701	A5
I702	B5
I704	C5
I705	C5
I707	D5
I709	D5
I710	E4
I711	E5
I713	E5
I714	F5
I715	A8
I716	B8
I717	B8
I718	B8
I719	D7
I720	F10
I721	F9
I722	E5
I727	F8
I728	F8
I729	A5
I730	A5
I731	B5
I732	B5
I733	B7
I734	B7
I735	A7
I736	A7
I739	E7

Mono Carrier: Front Control


A9
FRONT CONTROL
1
2
3
4
A
B
C
D
E
F
A4,A9
KEY_PROTN
F682
3689 RES
3683 RES
9683
3684 1K2
3685 150R
3686 390R
3687 1K8
3681 820R
I681
I688
I682
I683
F683
I686
POWER
1606
TS
USA
DVD Eject
1604
channel+
1603
channel-
1602
volume+
1601
F685
volume-
1600
F692
2V / div DC
2ms / div
+6V
3695 RES
I691
4695 RES
STANDBY LED
6691
3690 220R
A4
LED
4692
F693
3691 330R
I689
F696
3692
3693 220R
I693
6692 TSOP1836
VS
OUT
GND
IR RECEIVER
3694 4K7
2691 100u
6694 BZX384-C5V1
A4
IR
F691
4691
F692
IR_OUT
F699
IR
LED_OUT
for ITV only
For Engg Purpose Only
F694
4694
F695
6693 BPW46
7691 BC847B
I687
1692
F697
1693
To 1693 of J
2692 47n
3696 680K
4693
3697 10K
F698
LIGHT_SENSOR
A4
KEY_PROTN
A9

ITEM NO.	NAFTA	LATAM	EU	AP
6691	LTL-10234WHCR (GREEN)	LTL-10234WHCR (GREEN)	LTL-10224WHCR (RED)	LTL-10224WHCR (RED)

	SETS WITH LIGHT_SENSOR
4693	JMP

3139 123 5676.1

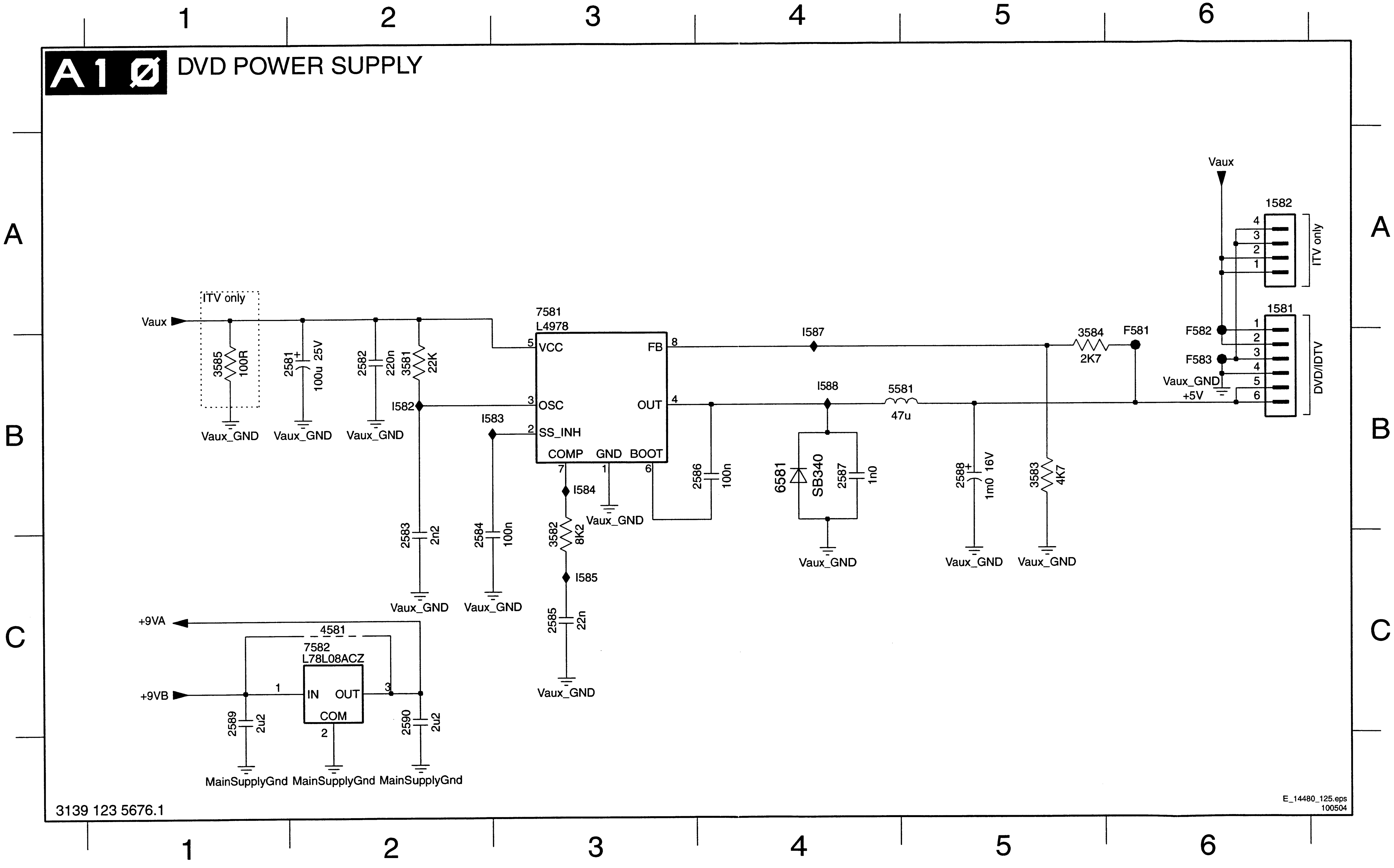
E_14480_124.eps
260504

1600	B4
1601	B4
1602	B4
1603	B3
1604	B3
1606	B2
1692	D4
1693	D4
2691	D4
2692	E2
3681	A4
3683	A2
3684	A2
3685	A3
3686	A3
3687	A4
3689	A2
3690	C4
3691	C3
3692	C2
3693	C4
3694	D3
3695	C2
3696	E2
3697	E3
4691	D2
4692	C2
4693	E3
4694	E1
4695	C3
6691	C3
6692	C4
6693	E2
6694	D4
7691	D3
9683	A2
F682	A2
F683	A4
F685	B4
F691	D2
F692	D3
F693	C2
F694	D1
F695	D2
F696	C2
F697	D4
F698	E3
F699	D3
I681	A2
I682	A3
I683	A4
I686	A4
I687	E2
I688	A3
I689	C4
I691	C3
I693	C3

Personal Notes:

E_06532_012.eps
130204

Mono Carrier: DVD Power Supply


A1
DVD POWER SUPPLY
1
2
3
4
5
6
A
B
C
Vaux
ITV only
3585
100R
2581
100u 25V
2582
220n
3581
22K
Vaux_GND
I582
I583
7581
L4978
5 VCC
3 OSC
2 SS_INH
COMP
GND
BOOT
FB 8
OUT 4
7
1
6
I584
3582
8K2
I585
2585
22n
2583
2n2
2584
100n
2586
100n
I587
I588
5581
47u
6581
SB340
2587
1n0
2588
1m0 16V
3583
4K7
3584
2K7
F581
F582
F583
Vaux_GND
+5V
1582
ITV only
1581
DVD/IDTV
+9VA
4581
7582
L78L08ACZ
IN
OUT
COM
+9VB
2589
2u2
2590
2u2
MainSupplyGnd
3139 123 5676.1
E_14480_125.eps
100504

1581	A6
1582	A6
2581	B2
2582	B2
2583	C2
2584	C2
2585	C3
2586	B4
2587	B4
2588	B5
2589	C1
2590	C2
3581	B2
3582	C3
3583	B5
3584	B5
3585	B1
4581	C2
5581	B5
6581	B4
7581	A3
7582	C2
F581	B6
F582	B6
F583	B6
I582	B2
I583	B3
I584	B3
I585	C3
I587	B4
I588	B4

Layout Mono Carrier: (Top Side)

1000	E8
1001	E6
1002	E5
1003	E5
1004	E7
1005	E8
1010	E7
1011	E7
1012	E6
1013	E8
1204	C6
1205	D5
1206	D5
1207	E7
1208	D7
1212	C6
1213	C5
1219	C7
1220	E4
1221	C5
1222	D3
1230	D5
1234	D5
1240	D4
1241	D5
1242	E4
1243	C6
1245	D6
1280	E3
1281	E3
1282	D3
1401	C7
1402	A6
1404	A5
1451	C7
1452	A8
1453	B5
1454	B7
1470	A8
1500	A2
1501	A2
1502	B2
1503	C3
1504	C2
1505	A2
1506	A2
1507	C2
1508	A2
1509	C2
1510	B1
1532	B3
1535	C5
1542	C4
1543	C4
1545	C4
1581	D4
1582	C3
1600	C1
1601	C1
1602	D1
1603	D1
1604	C1
1606	A1
1682	D4
1683	C5
1684	D6
1692	C1
1693	C1
1727	C7
1728	D8
1729	D7
1734	D8
1735	D8
1762	D7
1763	E8
1764	C7
1765	C7
1766	D7
1767	D7
1768	E7
1769	D8
1770	D8
1902	D2
1903	D3
2005	E5
2006	E7
2008	E8
2203	D5
2217	E5
2218	D6
2224	E5
2230	D6
2234	D6
2240	E5
2250	D6
2251	E5
2265	E6
2273	E6
2275	E6
2404	B6
2405	A6
2406	A6
2411	B6
2412	A6
2413	B6
2415	A5
2416	B6
2417	A6
2418	A5
2419	B6
2427	B6
2451	A8
2454	A8
2455	A8
2457	C7
2458	C7
2459	A8
2460	A7
2463	C8
2465	C8
2467	C7
2481	A7
2484	A8
2486	B6
2492	B6
2493	A7
2500	A2
2501	C2
2502	C2
2503	A4
2504	A4
2505	A4
2506	A3
2507	A3
2508	C2
2509	C1
2511	A5
2514	A4
2528	B4
2534	B3
2535	C3
2536	C3
2537	C3
2539	C3
2540	C3
2541	C3
2542	B4
2543	B3
2545	B3
2546	B3
2551	B5
2552	C5
2561	C4
2562	B4
2563	C4
2565	C4
2570	B4
2581	C4
2588	C4
2611	E4
2621	E5
2624	E5
2631	D7
2691	B1
2703	C7
2709	C7
2733	C7
2739	C7
2752	E7
2754	E8
2945	D2
2948	D2
2949	D2
2960	D2
2961	D1
2978	C3
3020	E7
3201	D5
3215	D5
3224	E5
3230	D4
3231	D6
3234	C6
3239	C7
3241	E5
3246	D5
3249	D7
3252	D5
3258	D7
3260	D5
3270	D7
3274	D7
3275	E7
3276	C7
3277	C7
3278	D7
3291	D7
3401	C6
3402	A7
3407	A7
3411	A6
3412	A6
3414	C6
3415	B6
3417	A6
3418	C5
3425	C5
3430	B6
3431	C6
3432	B7
3433	B6
3434	B6
3440	C5
3441	B6
3442	A7
3443	A7
3447	A7
3451	B6
3454	A8
3458	B7
3460	B7
3461	C7
3466	C7
3467	C7
3468	C7
3470	C8
3471	C7
3472	C7
3482	B8
3483	B8
3484	B8
3485	B8
3497	C5
3500	B1
3501	B1
3502	A1
3503	B1
3504	B2
3505	A2
3506	B1
3507	B3
3508	A3
3509	B2
3510	B2
3511	B5
3513	A5
3514	A5
3515	A5
3516	A4
3519	B4
3520	A4
3521	A5
3523	B2
3529	B3
3531	B4
3532	B3
3534	B4
3542	B3
3563	C4
3571	B5
3574	B5
3575	B5
3577	B5
3584	C4
3585	D4
3589	C5
3603	C6
3606	E4
3616	C6
3617	C6
3618	C6
3639	E4
3683	B1
3701	C8
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3709	D8
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5561	B4
5562	B4
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5908	D2
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6454	B8
6455	B8
6456	A8
6459	B8
6480	B8
6481	B8
6486	C6
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6693	B1
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7453	C7
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7582	D4
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7605	E5
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7906	C3
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9214	D4
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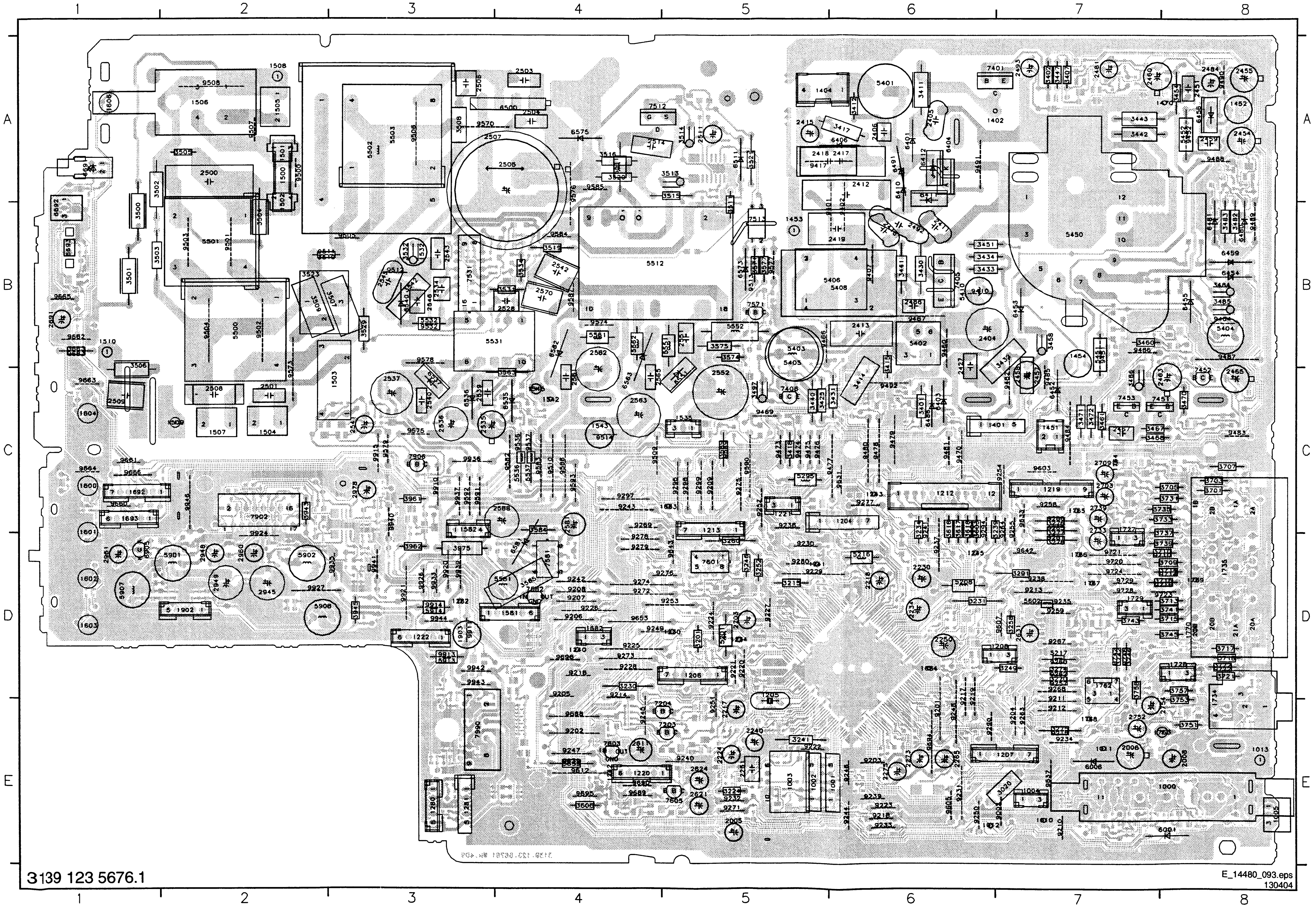

Layout Mono Carrier (Overview Bottom Side)

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2259	B5
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2261	A6
2262	B6
2263	A6
2264	B6
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2267	A6
2268	A5
2269	A5
2270	A6
2271	A6
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2274	A6
2276	A6
2277	B5
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2279	B5
2280	B5
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2290	A5
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2456	D8
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2462	D7
2464	C8
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3245	C5
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5212	A6
5213	B6
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6211	B5
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6901	B3
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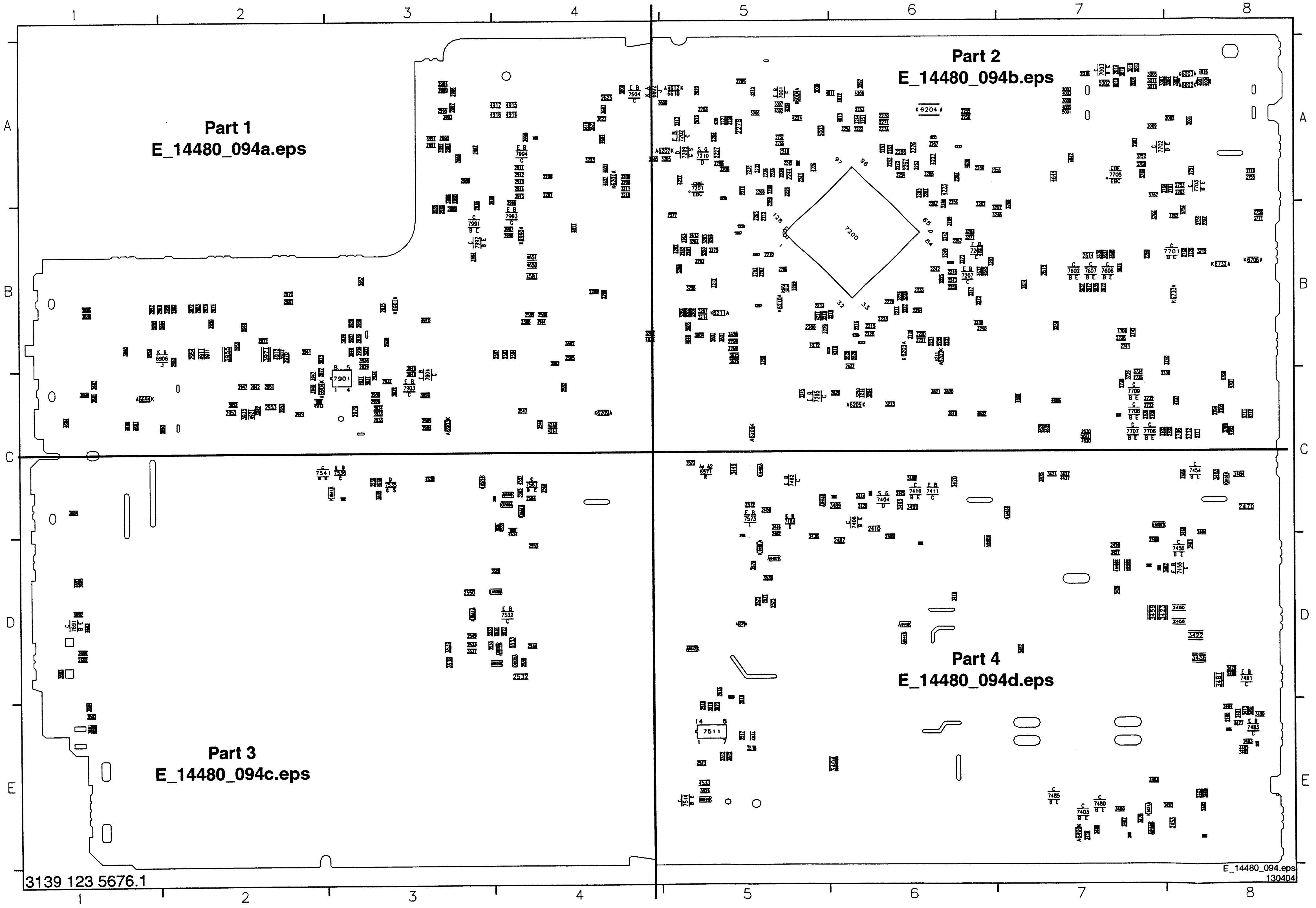
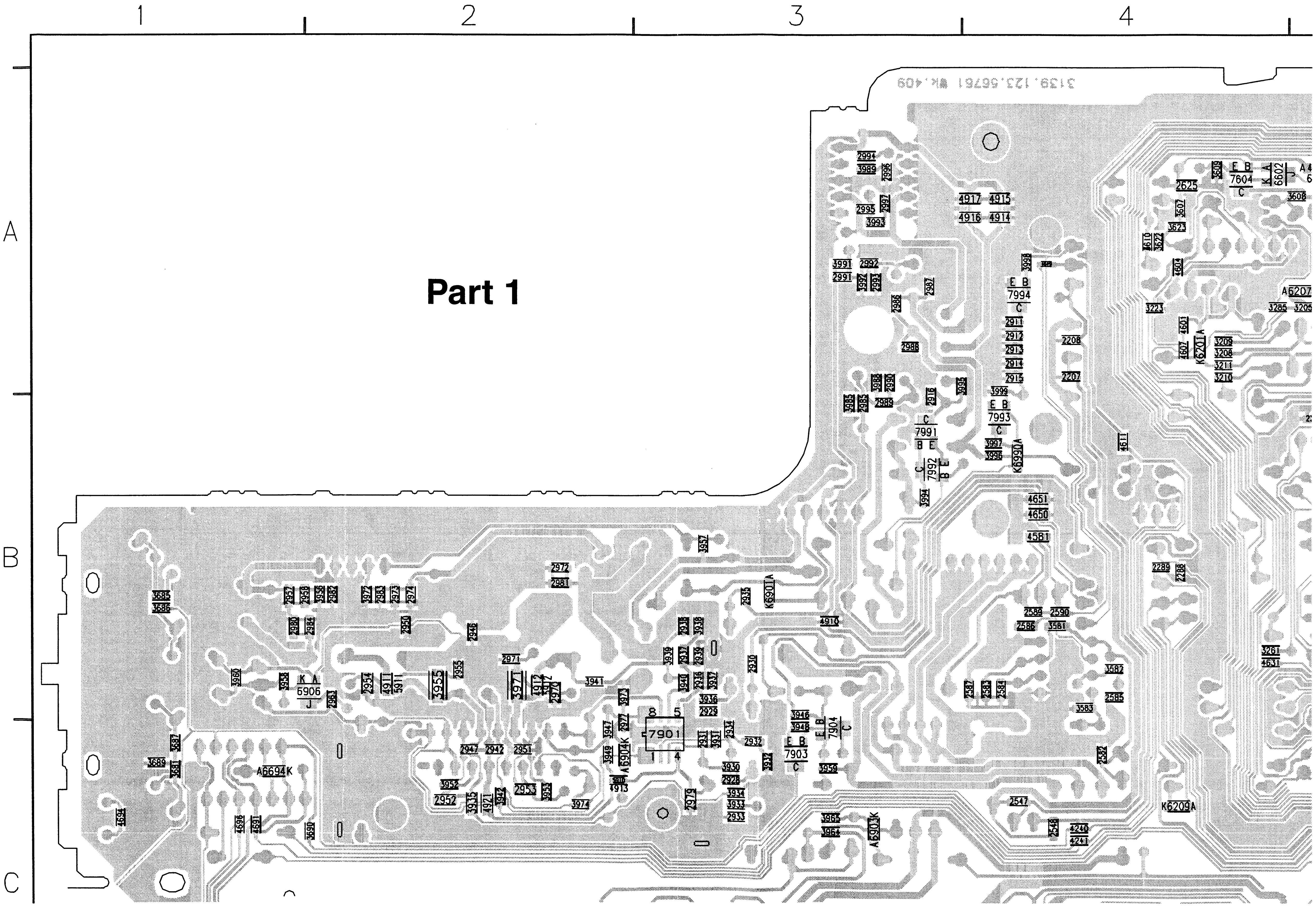


Layout Mono Carrier (Part 1 Bottom Side)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B
C
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A6904
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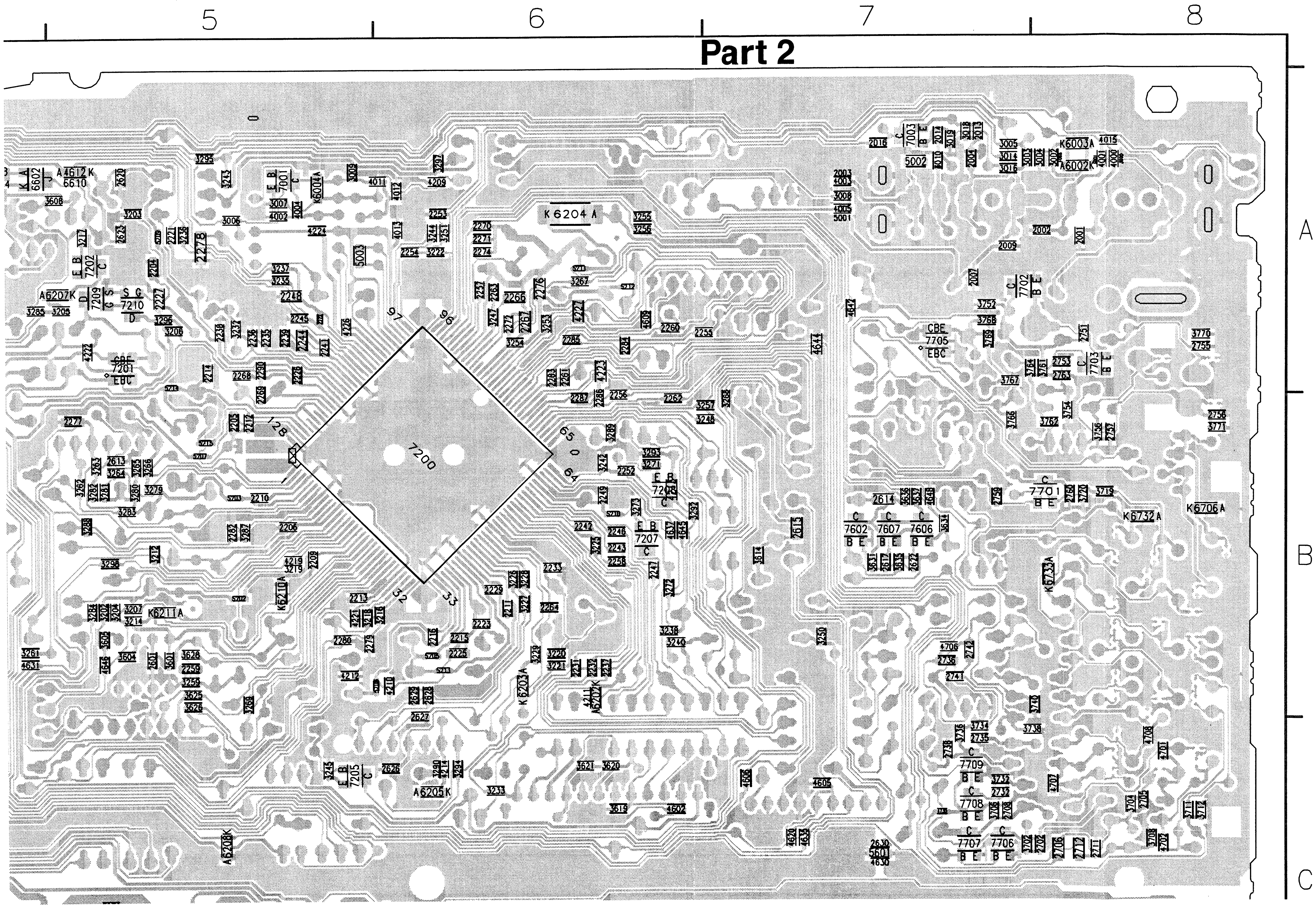
E_14480_094a.eps
130404

Layout Mono Carrier (Part 2 Bottom Side)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6
7
8
Part 2
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B
C
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7706
7602
7607
7606
7207
7208
7205
7201
7202
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7003
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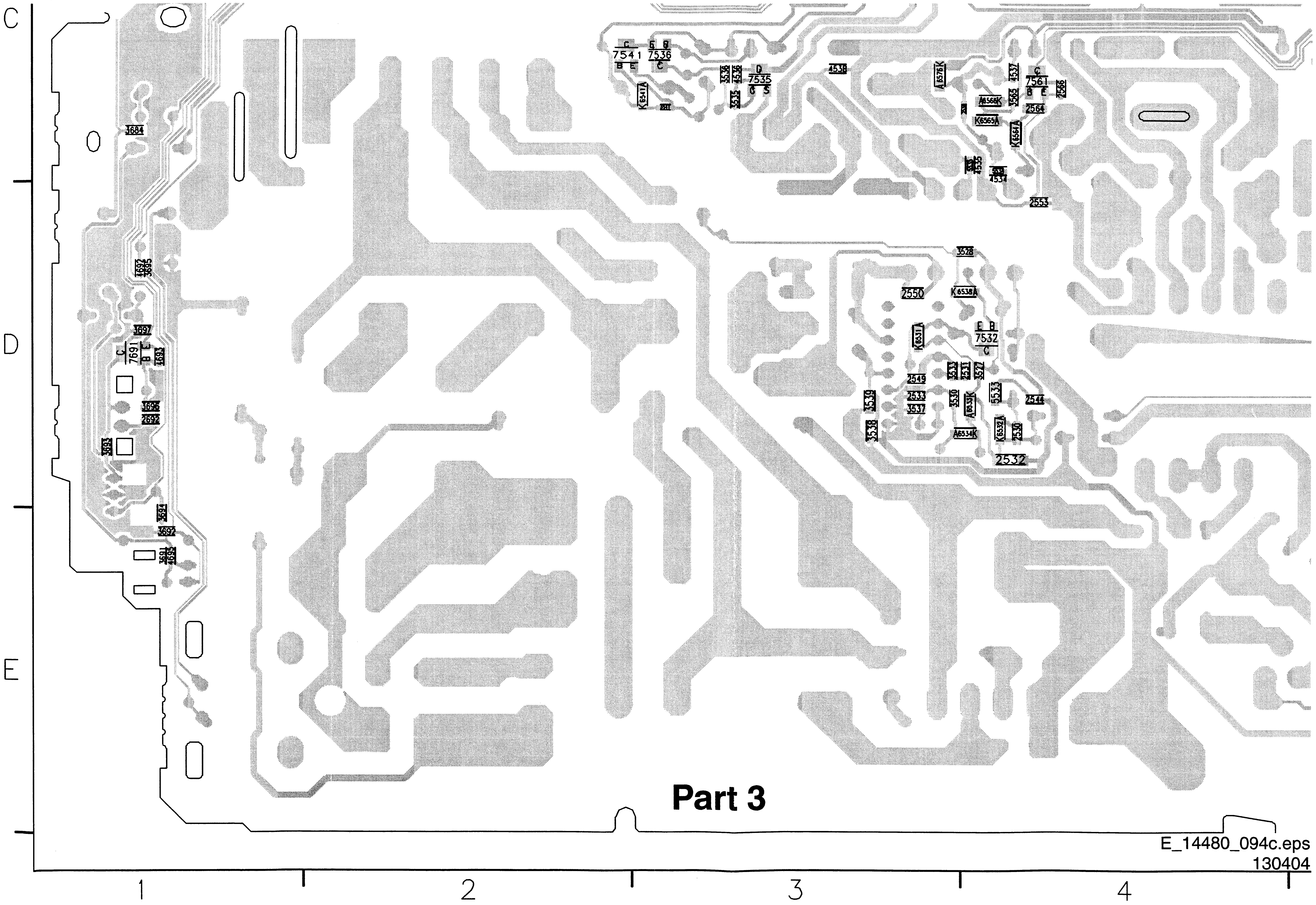
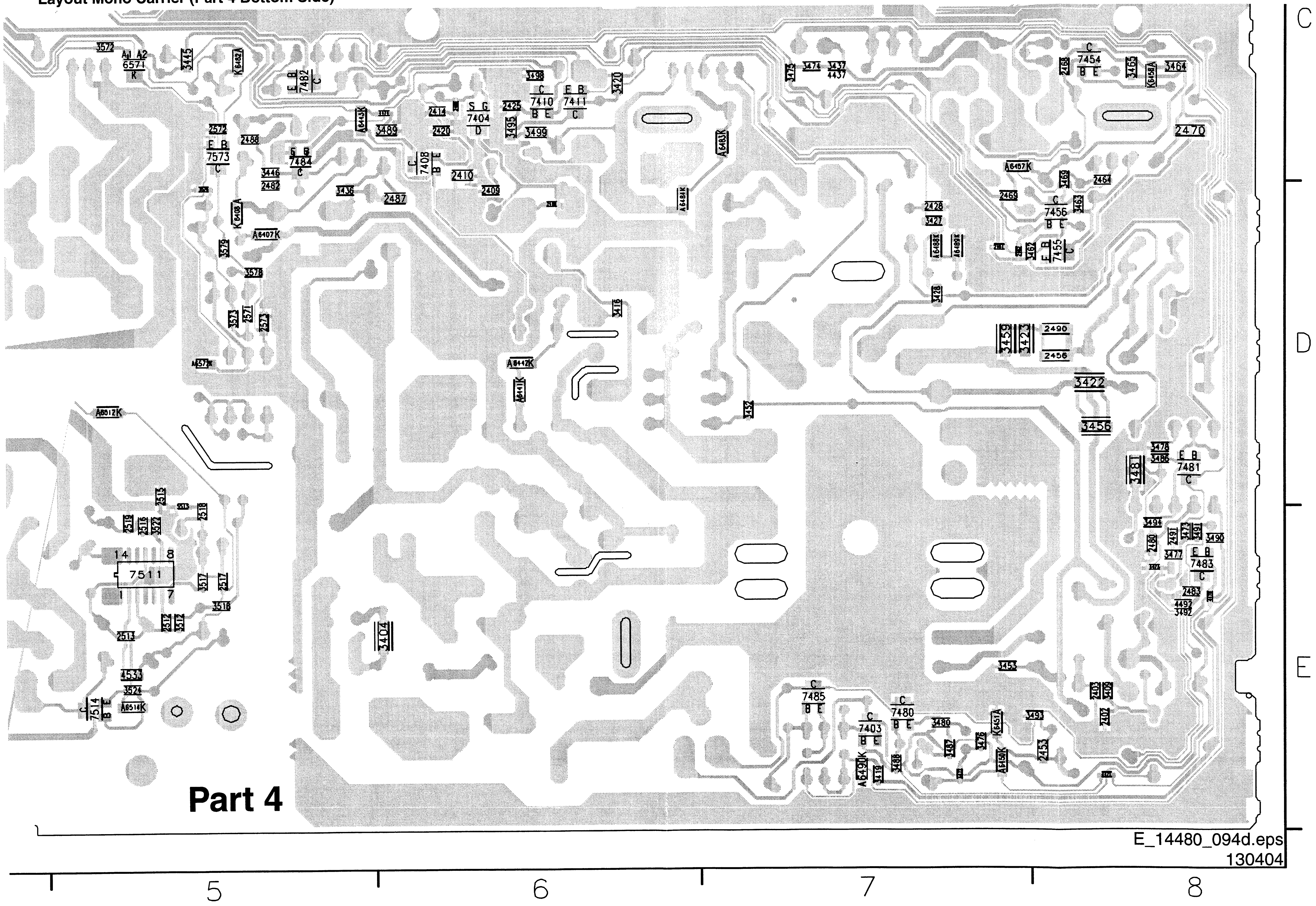
6602

E_14480_094b.eps
130404

Layout Mono Carrier (Part 3 Bottom Side)


C
D
E
1
2
3
4
Part 3
3684
3693
3695
3697
7691
3694
3696
2692
3692
3691
7541
7536
7535
3536
4536
3535
4538
6576
4537
7561
2568
2563
6568
6565
2564
6564
4535
4534
2553
3528
2550
6538
6531
7532
2549
2533
3537
3539
3538
3533
2531
3532
3530
6534
6533
6532
2530
2544
2532
E_14480_094c.eps
130404

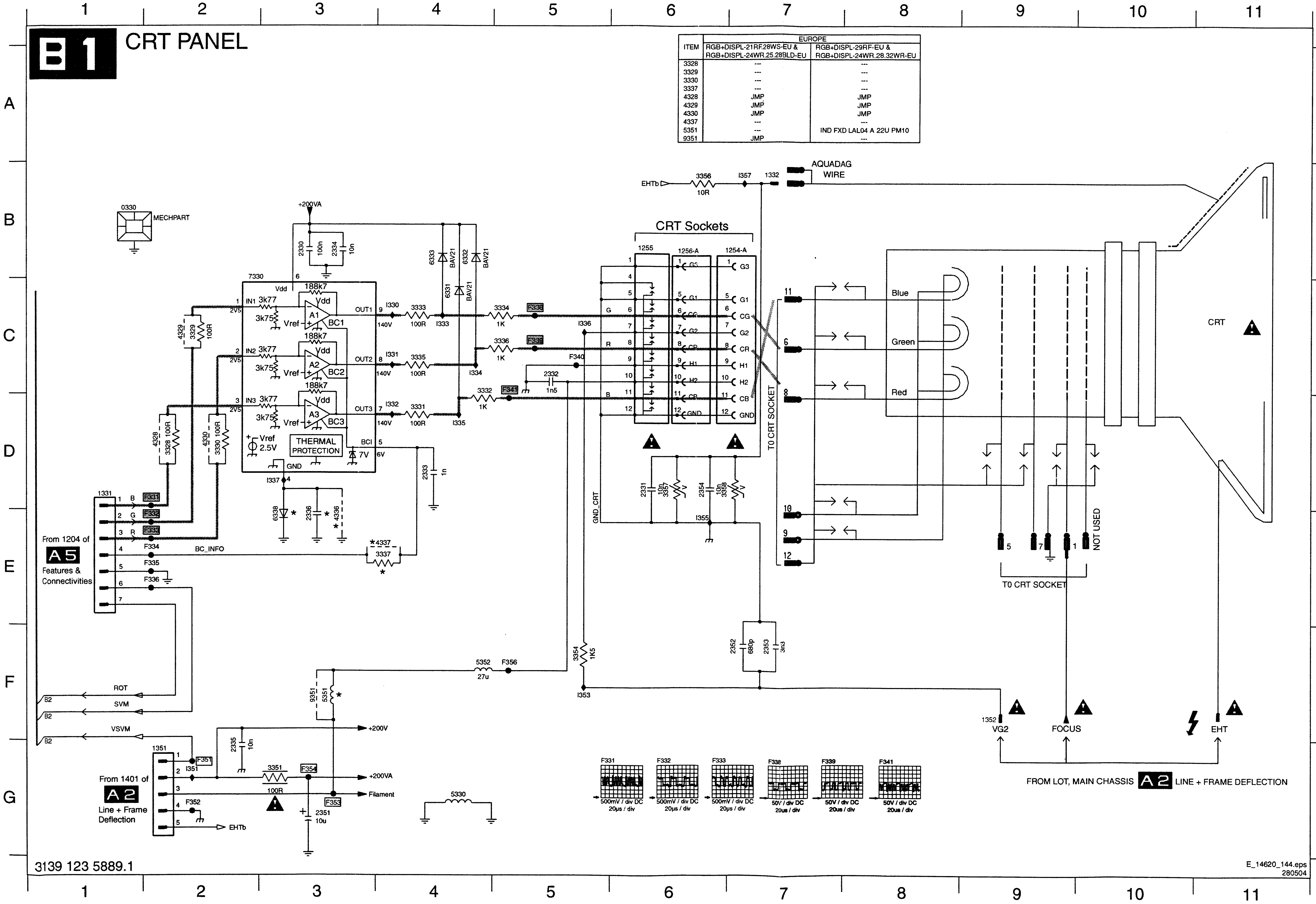
Layout Mono Carrier (Part 4 Bottom Side)


C
D
E
5
6
7
8
Part 4
3572
6571
3445
7482
3498
7410
7411
3420
3474
3437
4437
7454
3464
7404
7499
3489
2414
2420
2425
3495
3499
2572
2488
7573
7484
3446
2482
3436
2487
7408
2410
2409
2470
2469
7456
2464
2428
3427
7455
3428
3578
3459
3423
2490
2456
3422
3456
3481
3478
3486
7481
3494
2491
3490
3477
7483
2483
4492
3492
3453
7485
7480
7403
3480
3493
2453
2452
3404
3513
3519
3516
3522
2518
7511
3517
2517
3518
2513
4533
3524
7514
E_14480_094d.eps
130404

CRT Panel

B1 CRT PANEL

ITEM	EUROPE	
	RGB+DISPL-21RF.28WS-EU & RGB+DISPL-24WR.25.28BLD-EU	RGB+DISPL-29RF-EU & RGB+DISPL-24WR.28.32WR-EU
3328	---	---
3329	---	---
3330	---	---
3337	---	---
4328	JMP	JMP
4329	JMP	JMP
4330	JMP	JMP
4337	---	---
5351	---	IND FXD LAL04 A 22U PM10
9351	JMP	---



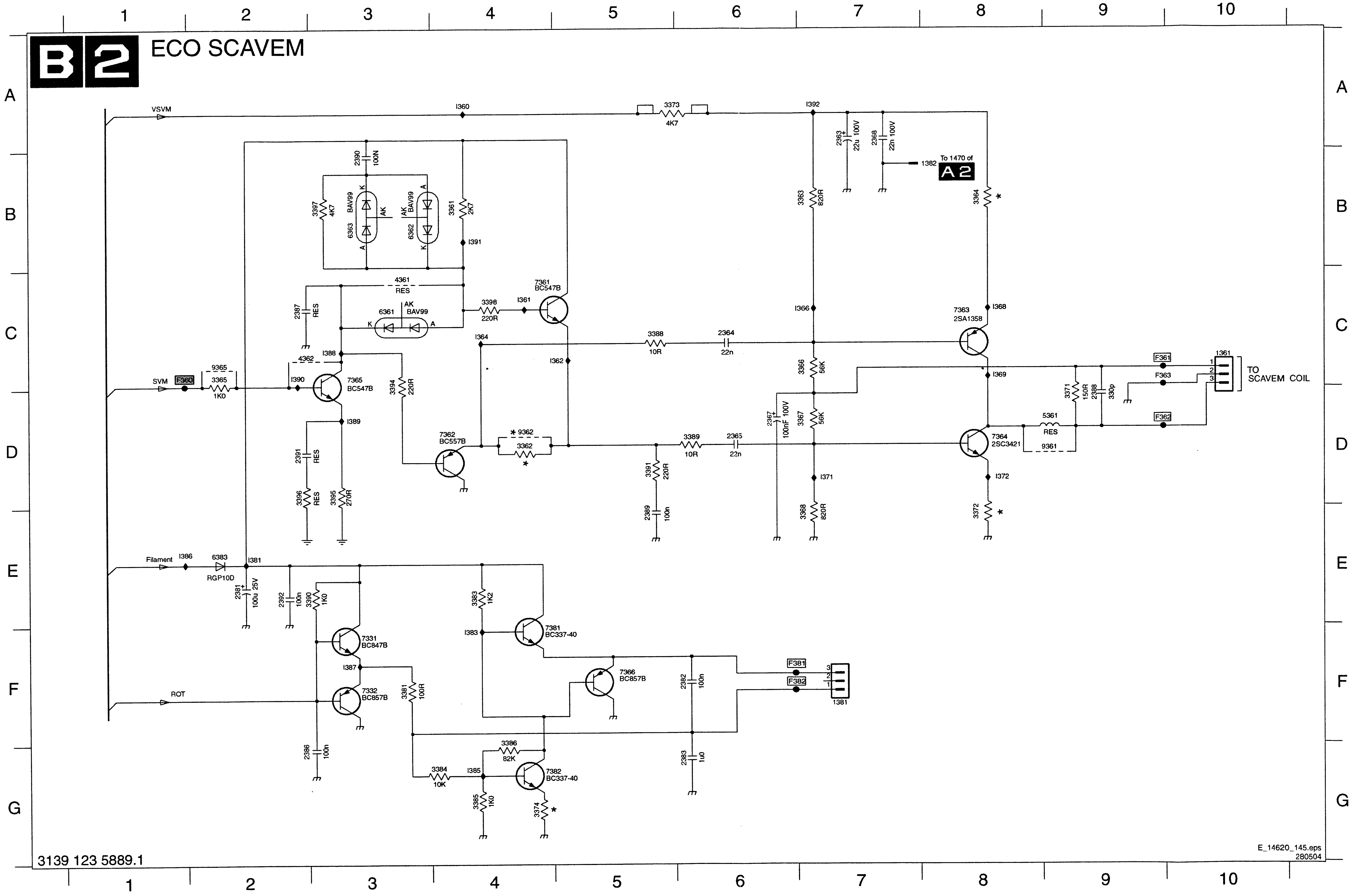
1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
EHTb
3356
10R
I357
1332
AQUADAG
WIRE
0330
MECHPART
+200VA
2330
100n
2334
10n
6333
BAV21
6332
BAV21
6331
BAV21
7330
Vdd
6
188k7
IN1
3k77
3k75
Vref
A1
BC1
OUT1
IN2
A2
BC2
OUT2
IN3
A3
BC3
OUT3
2V5
+ Vref
2.5V
THERMAL
PROTECTION
BCI
5
7V
6V
GND
I337
4
I330
3333
100R
140V
I333
I331
3335
I334
I332
3331
I335
3334
1K
F338
3336
F339
3332
F341
F340
2332
1n5
I336
4329
3329
100R
4328
3328 100R
4330
3330 100R
2333
1n
1331
B
G
R
F331
F332
F333
F334
F335
F336
BC_INFO
From 1204 of
A5
Features &
Connectivities
4337
3337
6338
2336
4336
CRT Sockets
1255
1256-A
1254-A
G3
G1
CG
G2
CR
H1
H2
CB
GND
GND_CRT
2331
10n
3357
2354
10n
3358
I355
TO CRT SOCKET
11
6
8
10
9
12
Blue
Green
Red
CRT
5
7
1
NOT USED
T0 CRT SOCKET
2352
680p
2353
3n3
3354
1K5
I353
5352
27u
F356
9351
5351
ROT
SVM
VSVM
B2
1351
F351
I351
2335
10n
3351
100R
F354
F353
F352
2351
10u
+200V
+200VA
Filament
EHTb
From 1401 of
A2
Line + Frame
Deflection
5330
1352
VG2
FOCUS
EHT
FROM LOT, MAIN CHASSIS
A2
LINE + FRAME DEFLECTION
F331
500mV / div DC
20µs / div
F332
500mV / div DC
20µs / div
F333
500mV / div DC
20µs / div
F338
50V / div DC
20us / div
F339
50V / div DC
20us / div
F341
50V / div DC
20us / div

3139 123 5889.1

E_14620_144.eps
280504

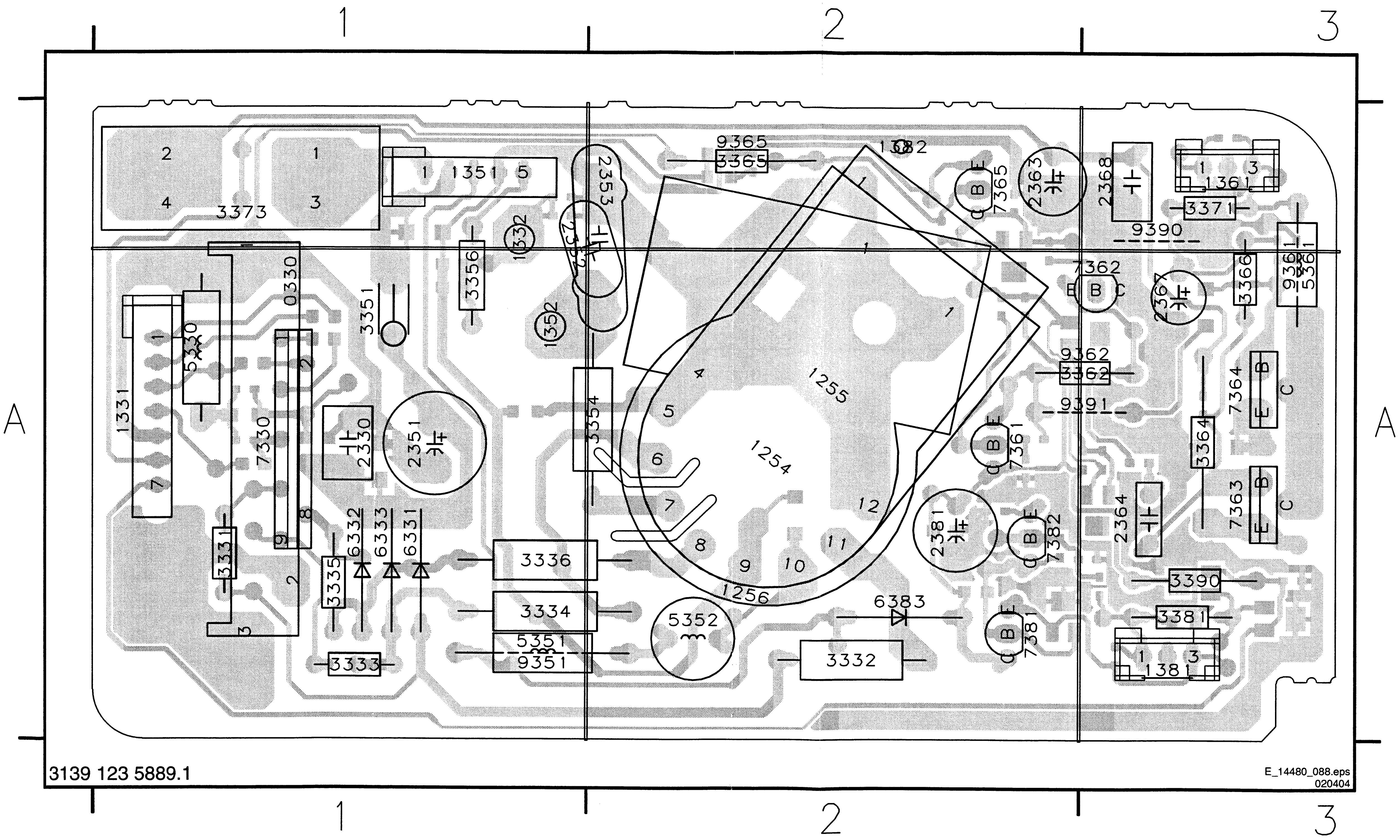
Item	Location
0330	B1
1254-A	B7
1255	B6
1256-A	B6
1331	D1
1332	B7
1351	G2
1352	F9
2330	B3
2331	D6
2332	C5
2333	D4
2334	B3
2335	G2
2336	E3
2351	G3
2352	F7
2353	F7
2354	D6
3328	D2
3329	C2
3330	D2
3331	D4
3332	C4
3333	C4
3334	C5
3335	C4
3336	C5
3337	E4
3351	G3
3354	F5
3356	B6
3357	D6
3358	D6
4328	D2
4329	C2
4330	D2
4336	E3
4337	E4
5330	G4
5351	F3
5352	F4
6331	C4
6332	B4
6333	B4
6338	E3
7330	C2
9351	F3
F331	D2
F332	E2
F333	E2
F334	E2
F335	E2
F336	E2
F338	C5
F339	C5
F340	C5
F341	C5
F351	G2
F352	G2
F353	G3
F354	G3
F356	F5
I330	C4
I331	C4
I332	D4
I333	C4
I334	C4
I335	D4
I336	C5
I337	D3
I351	G2
I353	F5
I355	E6
I357	B7

CRT Panel: Eco Scavem


B2
ECO SCAVEM
1 2 3 4 5 6 7 8 9 10
A B C D E F G
VSVM
SVM
F360
Filament
ROT
1360
1392
3373 4K7
2363 22u 100V
2368 22n 100V
1382
To 1470 of A2
2390 100N
3397 4K7
6363 BAV99
6362 BAV99
3361 2K7
1391
3363 820R
3364 *
4361 RES
6361 BAV99
2387 RES
3398 220R
1361
7361 BC547B
1366
1368
7363 2SA1358
1364
3388 10R
2364 22n
1362
4362
1388
9365
3365 1K0
1390
7365 BC547B
3394 220R
3366 56K
1369
3371 150R
2388 330p
F361
F363
F362
1361
TO SCAVEM COIL
1389
2391 RES
7362 BC557B
9362 *
3362 *
3389 10R
2365 22n
2367 100nF 100V
3367 56K
5361 RES
9361
7364 2SC3421
3391 220R
1371
1372
3396 RES
3395 270R
2389 100n
3368 820R
3372 *
1386
6383 RGP10D
1381
2381 100u 25V
2392 100n
3390 1K0
3383 1K2
7381 BC337-40
1383
7331 BC847B
1387
7332 BC857B
3381 100R
7366 BC857B
2382 100n
F381
F382
1381
2386 100n
3386 82K
3384 10K
1385
7382 BC337-40
3385 1K0
3374 *
2383 1u0
3139 123 5889.1
E_14620_145.eps 280504

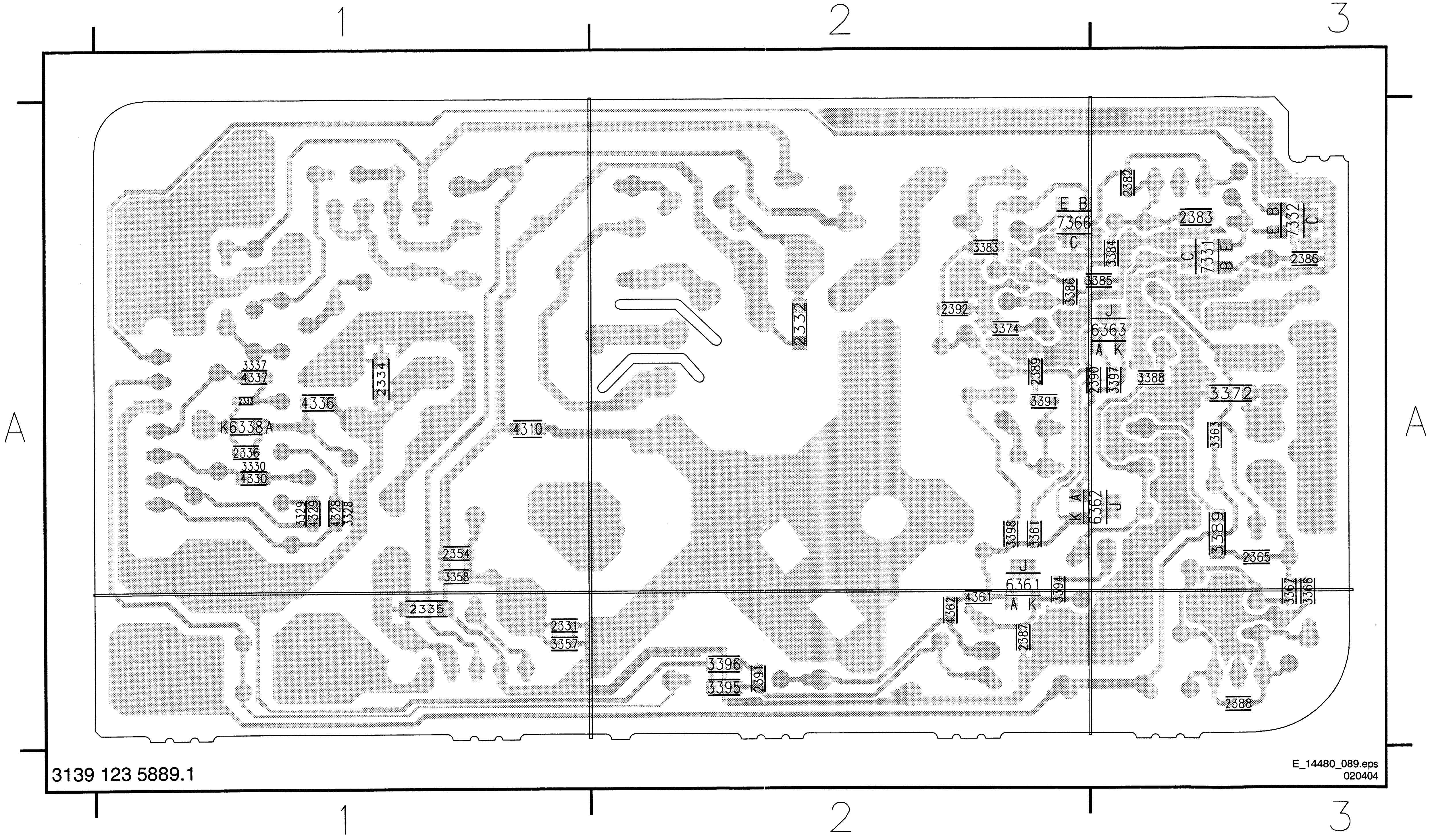
1361	C10
1381	F7
1382	B8
2363	A7
2364	C6
2365	D6
2367	D6
2368	A7
2381	E2
2382	F6
2383	G6
2386	G2
2387	C2
2388	D9
2389	E5
2390	B3
2391	D2
2392	E2
3361	B4
3362	D4
3363	B7
3364	B8
3365	C2
3366	C7
3367	D7
3368	E7
3371	D9
3372	E8
3373	A5
3374	G4
3381	F3
3383	E4
3384	G4
3385	G4
3386	G4
3388	C5
3389	D6
3390	E3
3391	D5
3394	C3
3395	D3
3396	D2
3397	B3
3398	C4
4361	C3
4362	C2
5361	D9
6361	C3
6362	B3
6363	B3
6383	E2
7331	F3
7332	F3
7361	C4
7362	D4
7363	C8
7364	D8
7365	C3
7366	F5
7381	F4
7382	G4
9361	D9
9362	D4
9365	C2
F360	C1
F361	C9
F362	D9
F363	C9
F381	F6
F382	F6
I360	A4
I361	C4
I362	C5
I364	C4
I366	C7
I368	C8
I369	C8
I371	D7
I372	D8
I381	E2
I383	F4
I385	G4
I386	E1
I387	F3
I388	C3
I389	D3
I390	C2
I391	B4
I392	A7

Layout CRT Panel (Top Side)


1
2
3
A
9365
3365
1382
1351
2353
2363
2368
1361
3371
9390
7365
3373
3332
3356
1352
3351
0330
5330
1331
7330
2330
2351
3354
1255
1254
1256
7362
2367
3366
9361
5361
9362
3362
9391
7364
3364
7361
7363
2364
2381
7382
6332
6333
6331
3331
3335
3336
3334
5351
9351
3333
5352
6383
7381
3390
3381
1381
3139 123 5889.1
E_14480_088.eps
020404

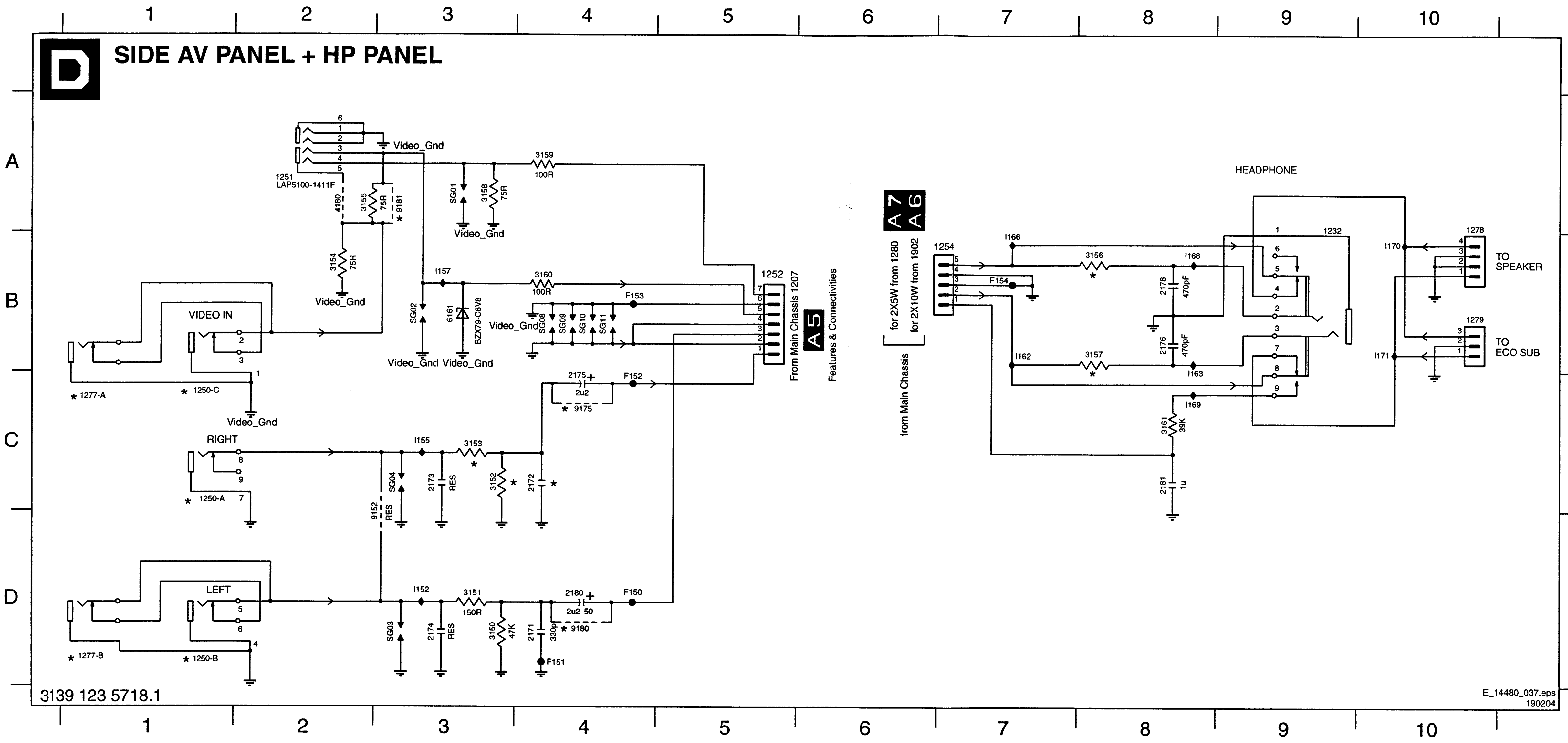
0330	A1
1254	A2
1255	A2
1256	A2
1331	A1
1332	A1
1351	A1
1352	A1
1361	A3
1381	A3
1382	A2
2330	A1
2351	A1
2352	A2
2353	A2
2363	A2
2364	A3
2367	A3
2368	A3
2381	A2
3331	A1
3332	A2
3333	A1
3334	A1
3335	A1
3336	A1
3351	A1
3354	A2
3356	A1
3362	A3
3364	A3
3365	A2
3366	A3
3371	A3
3373	A1
3381	A3
3390	A3
5330	A1
5351	A1
5352	A2
5361	A3
6331	A1
6332	A1
6333	A1
6383	A2
7330	A1
7361	A2
7362	A3
7363	A3
7364	A3
7365	A2
7381	A2
7382	A2
9351	A1
9361	A3
9362	A3
9365	A2
9390	A3
9391	A3

Layout CRT Panel (Bottom Side)


1
2
3
A
3337
4337
2333
4336
2334
K6338A
2336
3330
4330
3329
4329
4328
3328
4310
2354
3358
2335
2331
3357
2332
3396
3395
2391
3383
E B
7366
C
3384
2382
2383
E B
7332
C
C
7331
B E
2386
2392
3374
3386
3385
J
6363
A K
2389
3391
2390
3397
3388
3372
3363
K A
6362
J
3398
3361
3389
2365
J
6361
A K
3394
4362
4361
2387
3367
3368
2388
3139 123 5889.1
E_14480_089.eps
020404

2331	A1
2332	A2
2333	A1
2334	A1
2335	A1
2336	A1
2354	A1
2365	A3
2382	A3
2383	A3
2386	A3
2387	A2
2388	A3
2389	A2
2390	A3
2391	A2
2392	A2
3328	A1
3329	A1
3330	A1
3337	A1
3357	A1
3358	A1
3361	A2
3363	A3
3367	A3
3368	A3
3372	A3
3374	A2
3383	A2
3384	A3
3385	A3
3386	A2
3388	A3
3389	A3
3391	A2
3394	A2
3395	A2
3396	A2
3397	A3
3398	A2
4310	A1
4328	A1
4329	A1
4330	A1
4336	A1
4337	A1
4361	A2
4362	A2
6338	A1
6361	A2
6362	A3
6363	A3
7331	A3
7332	A3
7366	A2

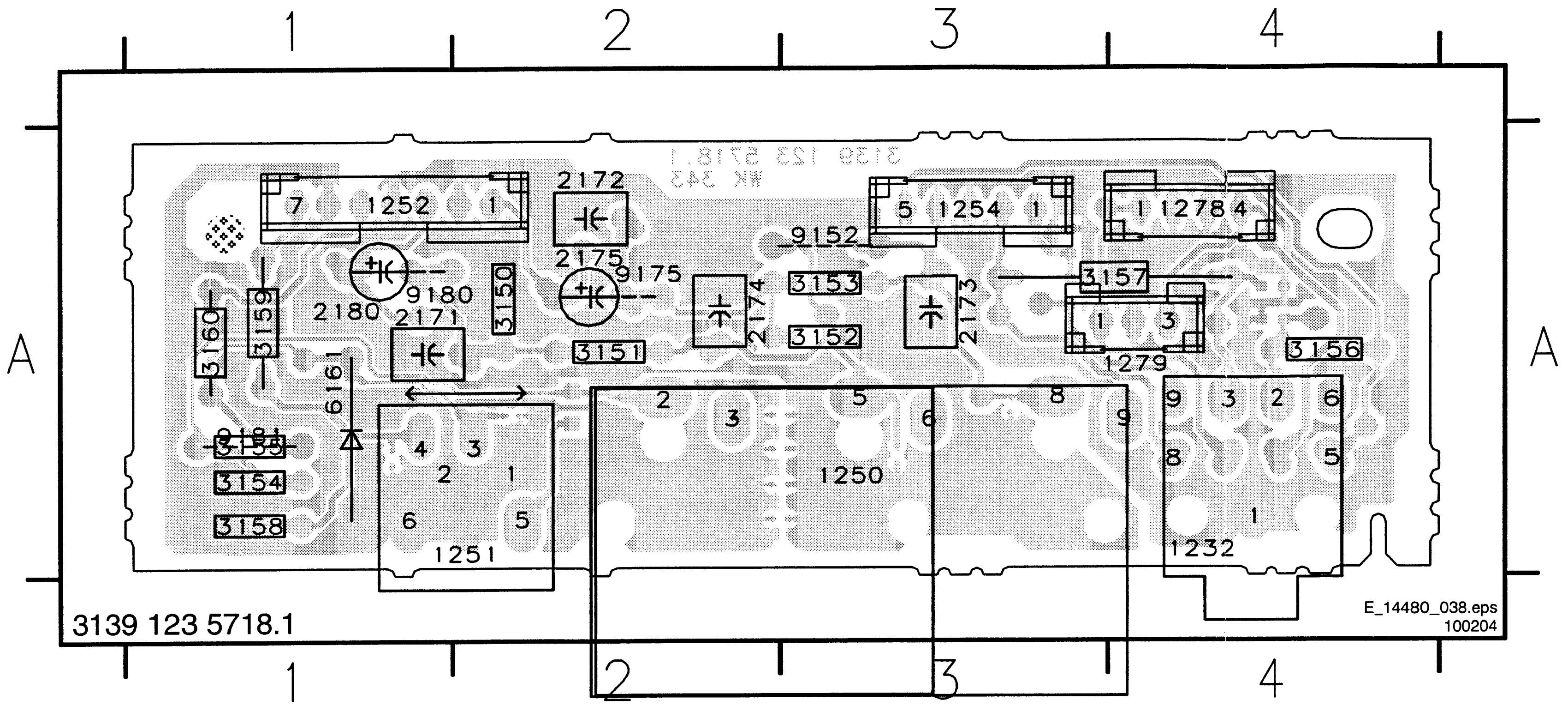
Side AV + Headphone Panel (PV-2)


D
SIDE AV PANEL + HP PANEL
1 2 3 4 5 6 7 8 9 10
A B C D
1251
LAP5100-1411F
Video_Gnd
4180
3155 75R
9181
3154 75R
SG01
3158 75R
3159 100R
I157
3160 100R
F153
SG02
6161
BZX79-C6V8
SG08 SG09 SG10 SG11
1252
From Main Chassis 1207
A5
Features & Connectivities
VIDEO IN
1277-A
1250-C
RIGHT
1250-A
I155
3153
SG04
2173 RES
3152
2172
9152 RES
2175 2u2
9175
F152
LEFT
1277-B
1250-B
I152
3151 150R
SG03
2174 RES
3150 47K
2171 330p
2180 2u2 50
9180
F150
F151
A7 A6
for 2X5W from 1280
for 2X10W from 1902
from Main Chassis
1254
F154
I166
3156
I168
2178 470pF
2176 470pF
I162
3157
I163
I169
3161 39K
2181 1u
HEADPHONE
1232
I170
I171
1278
TO SPEAKER
1279
TO ECO SUB
3139 123 5718.1
E_14480_037.eps
190204

1232	A9
1250-A	C1
1250-B	D1
1250-C	C1
1251	A2
1252	B5
1254	B6
1277-A	C1
1277-B	D1
1278	A10
1279	B10
2171	D4
2172	C4
2173	C3
2174	D3
2175	C4
2176	B8
2178	B8
2180	D4
2181	C8
3150	D3
3151	D3
3152	C3
3153	C3
3154	B2
3155	A2
3156	B8
3157	B8
3158	A3
3159	A4
3160	B4
3161	C8
4180	A2
6161	B3
9152	D3
9175	C4
9180	D4
9181	A3
F150	D4
F151	D4
F152	C4
F153	B4
F154	B7
I152	D3
I155	C3
I157	B3
I162	B7
I163	C8
I166	B7
I168	B8
I169	C8
I170	B10
I171	B10
SG01	A3
SG02	B3
SG03	D3
SG04	C3
SG08	B4
SG09	B4
SG10	B4
SG11	B4

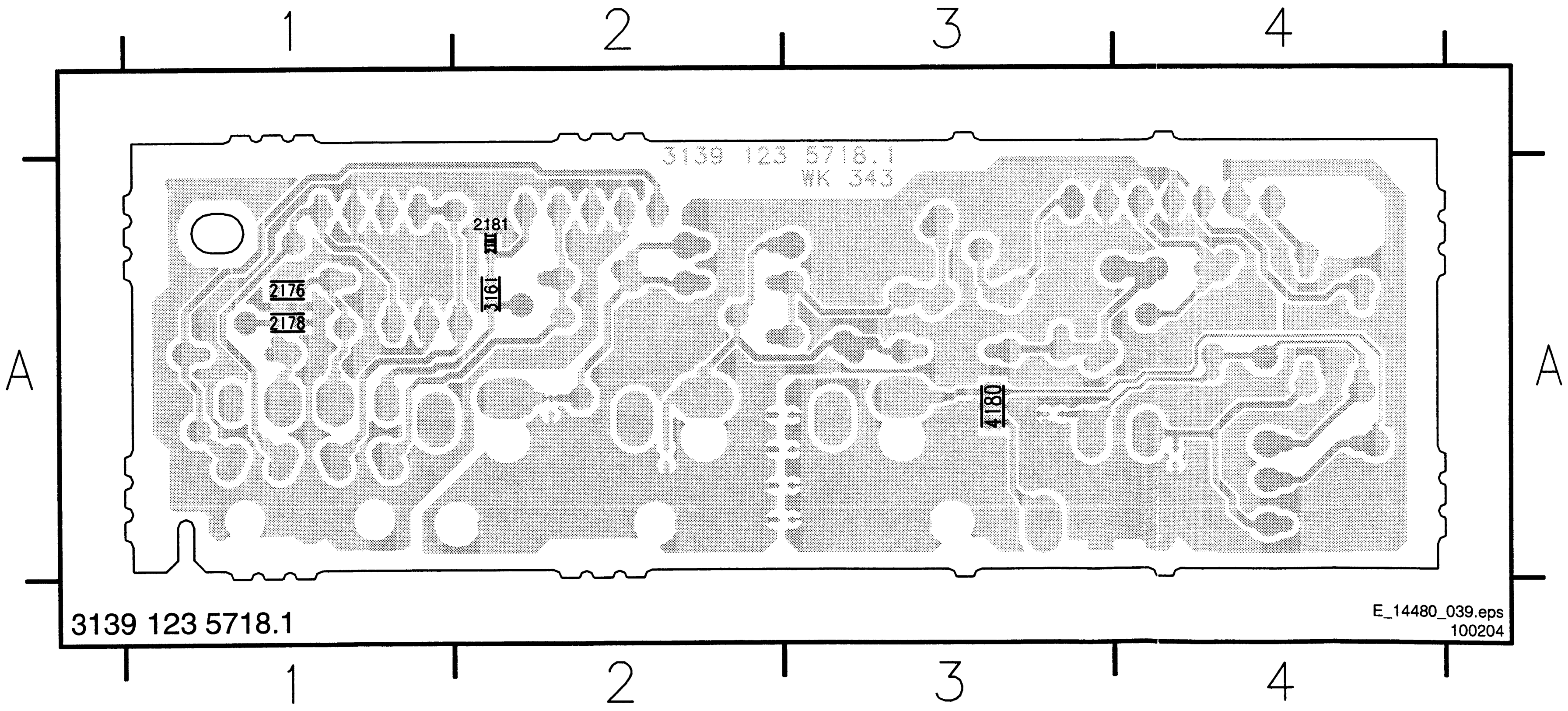
Layout Side AV + Headphone Panel (PV-2) (Top Side)

1232	A4	1254	A3	2171	A1	2175	A2	3152	A3	3156	A4	3160	A1	9180	A1
1250	A3	1277	A2	2172	A2	2180	A1	3153	A3	3157	A4	6161	A1	9181	A1
1251	A2	1278	A4	2173	A3	3150	A2	3154	A1	3158	A1	9152	A3		
1252	A1	1279	A4	2174	A2	3151	A2	3155	A1	3159	A1	9175	A2		

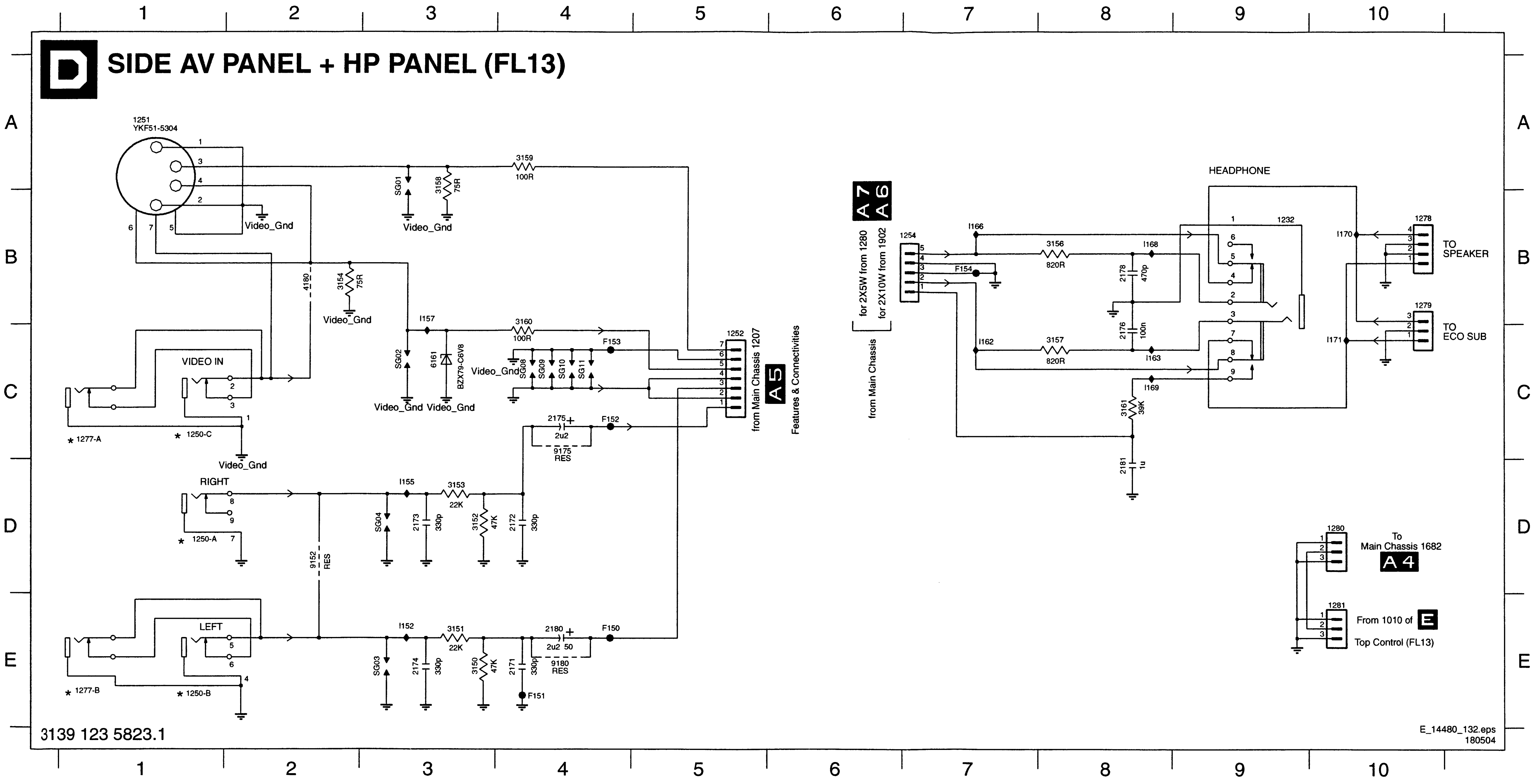

1
2
3
4
A
A
3139 123 5718.1
WK 343
7 1252 1
2172
2175
9175
9180
2180
2171
3150
3159
3160
6161
9181
3155
3154
3158
4 3 2 1 6 5
1251
3151
2174
3153
3152
9152
2173
5 1254 1
1 1278 4
3157
1 3
1279
3156
2 3 5 6 8 9
1250
9 3 2 6 8 5 1
1232
3139 123 5718.1
E_14480_038.eps
100204

Layout Side AV + Headphone Panel (PV-2) (Bottom Side)

2176	A1	2178	A1	2181	A2	3161	A2	4180	A3

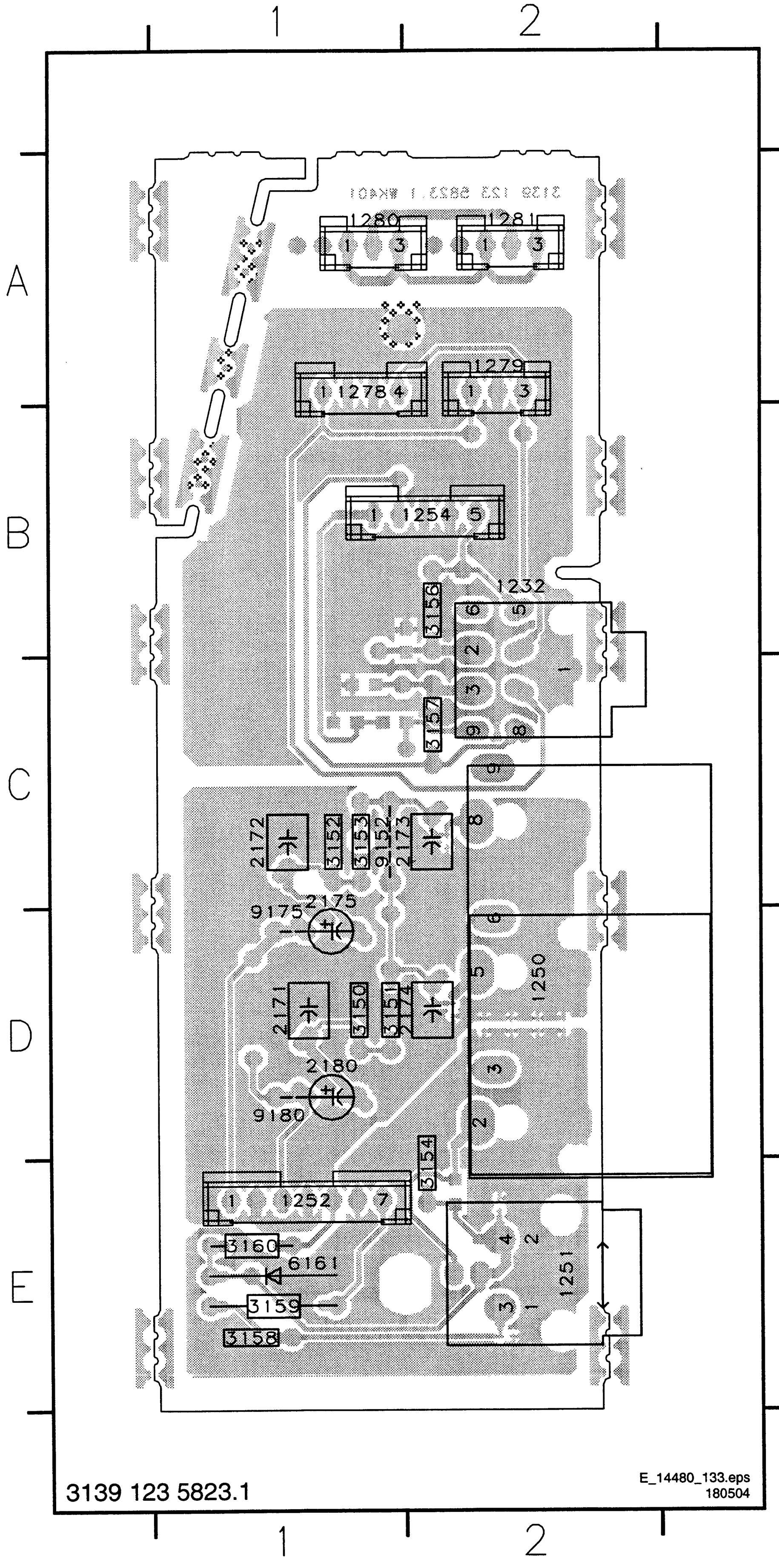

1
2
3
4
A
A
3139 123 5718.1
WK 343
2181
3161
2176
2178
4180
3139 123 5718.1
E_14480_039.eps
100204

Side AV + Headphone Panel (FL-13)


D
SIDE AV PANEL + HP PANEL (FL13)
1 2 3 4 5 6 7 8 9 10
A B C D E
1251
YKF51-5304
Video_Gnd
3159
100R
SG01
3158
75R
4180
3154
75R
VIDEO IN
I157
3160
100R
F153
6161
BZX79-C6V8
SG02
SG08 SG09 SG10 SG11
1252
from Main Chassis 1207
A5
Features & Connectivities
2175
2u2
9175
RES
F152
* 1277-A
* 1250-C
RIGHT
I155
3153
22K
SG04
2173
330p
3152
47K
2172
330p
* 1250-A
9152
RES
LEFT
I152
3151
22K
2180
2u2 50
F150
SG03
2174
330p
3150
47K
2171
330p
9180
RES
F151
* 1277-B
* 1250-B
3139 123 5823.1
A7
A6
for 2X5W from 1280
for 2X10W from 1902
from Main Chassis
1254
I166
F154
3156
820R
I168
2178
470p
2176
100n
I162
3157
820R
I163
I169
3161
39K
2181
1u
HEADPHONE
1232
I170
I171
1278
TO SPEAKER
1279
TO ECO SUB
1280
To Main Chassis 1682
A4
1281
From 1010 of E
Top Control (FL13)
E_14480_132.eps
180504

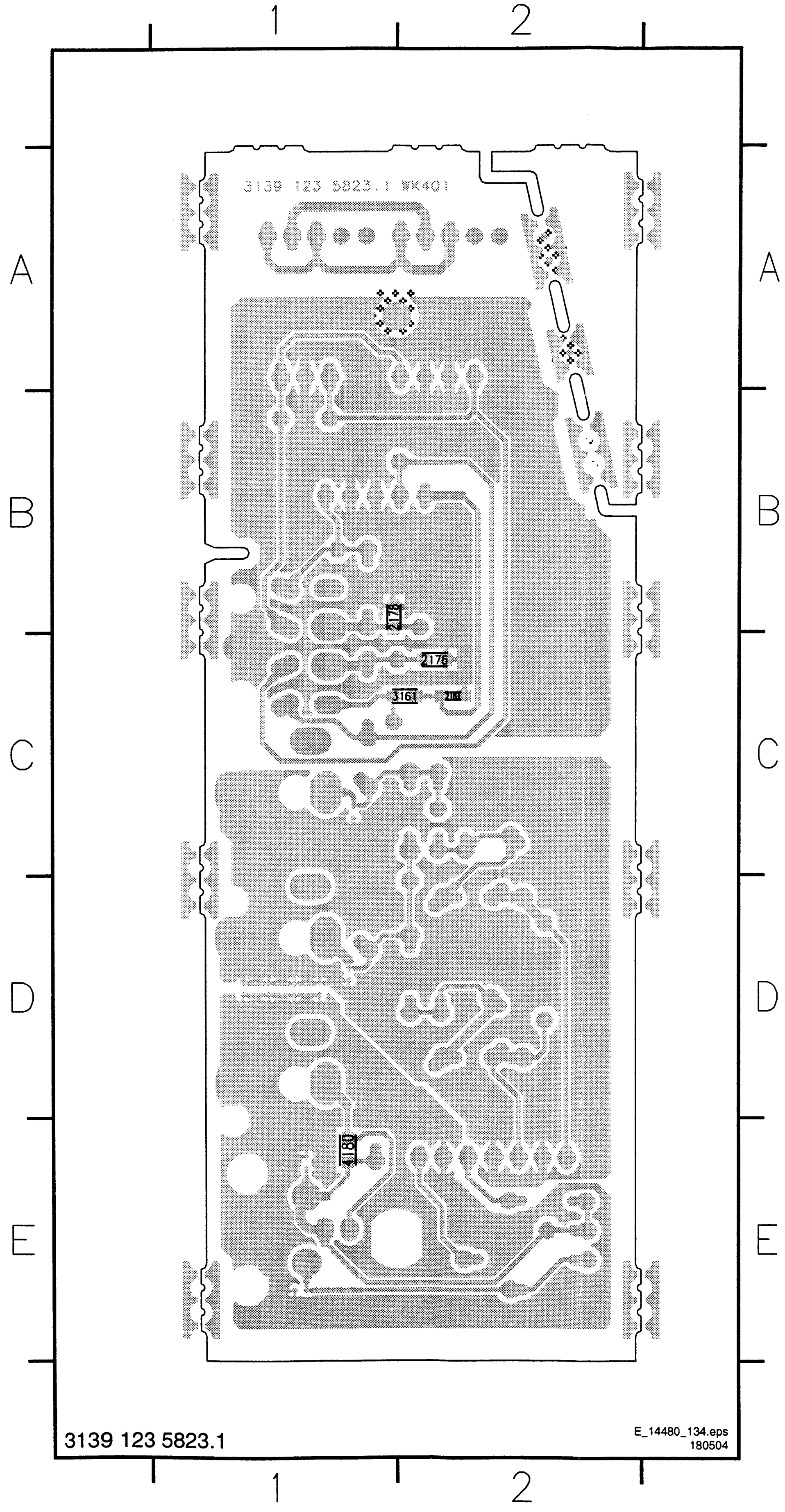
1232	B9
1250-A	D1
1250-B	E1
1250-C	C1
1251	A1
1252	C5
1254	B6
1277-A	C1
1277-B	E1
1278	B10
1279	B10
1280	D10
1281	E10
2171	E4
2172	D4
2173	D3
2174	E3
2175	C4
2176	C8
2178	B8
2180	E4
2181	D8
3150	E3
3151	E3
3152	D3
3153	D3
3154	B2
3156	B8
3157	C8
3158	A3
3159	A4
3160	C4
3161	C8
4180	B2
6161	C3
9152	D2
9175	C4
9180	E4
F150	E4
F151	E4
F152	C4
F153	C4
F154	B7
I152	E3
I155	D3
I157	B3
I162	C7
I163	C8
I166	B7
I168	B8
I169	C8
I170	B10
I171	C10
SG01	A3
SG02	C3
SG03	E3
SG04	D3
SG08	C4
SG09	C4
SG10	C4
SG11	C4

Layout Side AV + Headphone Panel (FL-13) (Top Side)


1
2
A
B
C
D
E
3139 123 5823.1 WK401
1280
1281
1278
1279
1254
1232
3156
3157
2172
3152
3153
9152
2173
9175
2175
2171
3150
3151
2174
1250
2180
9180
3154
1252
3160
6161
3159
3158
1251
3139 123 5823.1
E_14480_133.eps
180504

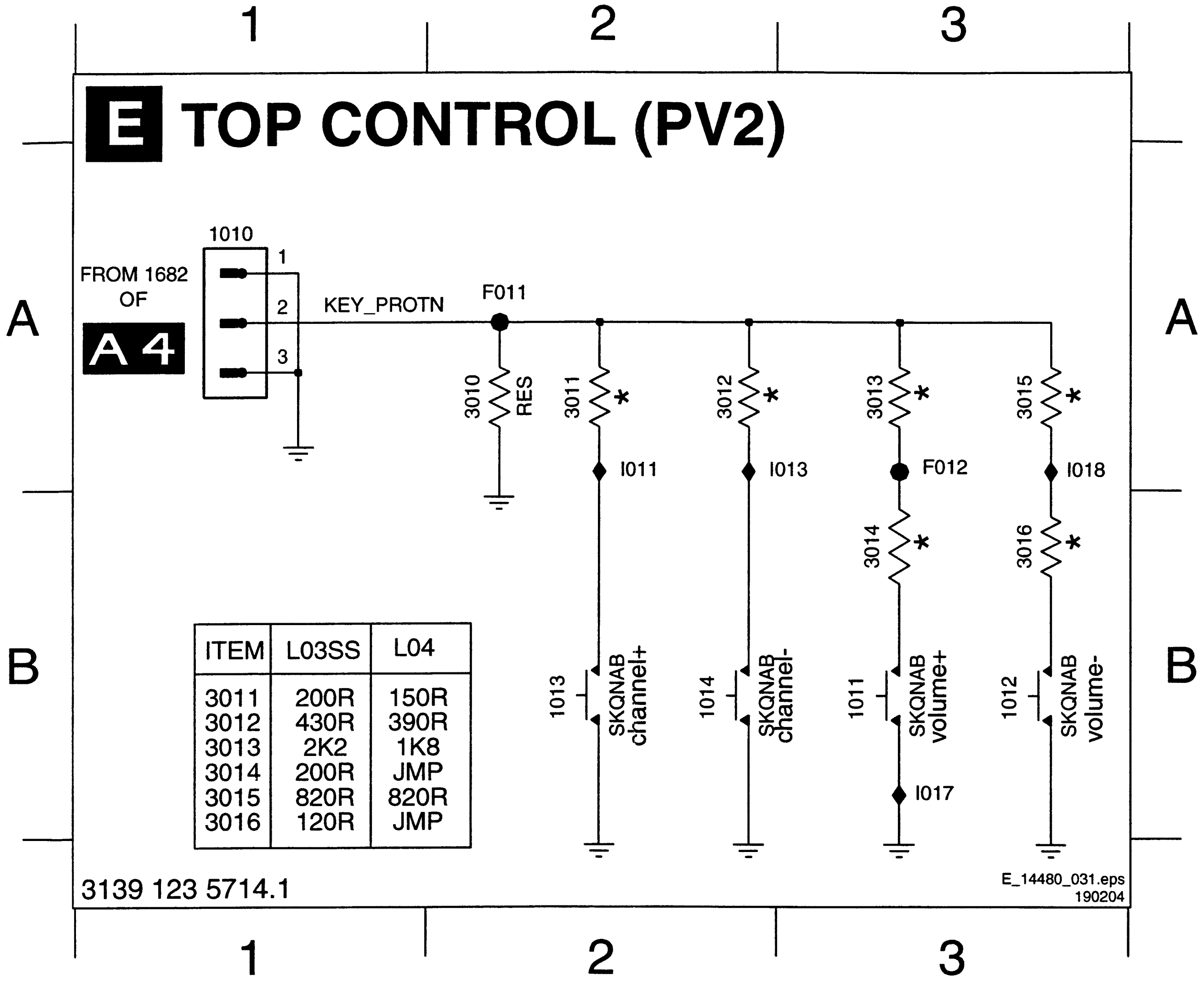
1232	B2
1250	D2
1251	E2
1252	E1
1254	B2
1277	D2
1278	A1
1279	A2
1280	A1
1281	A2
2171	D1
2172	C1
2173	C1
2174	D2
2175	C1
2180	D1
3150	D1
3151	D1
3152	C1
3153	C1
3154	E2
3156	B2
3157	C2
3158	E1
3159	E1
3160	E1
6161	E1
9152	C1
9175	D1
9180	D1

Layout Side AV + Headphone Panel (FL-13) (Bottom Side)


1
2
A
B
C
D
E
3139 123 5823.1 WK401
2178
2176
3161
4180
3139 123 5823.1
E_14480_134.eps
180504

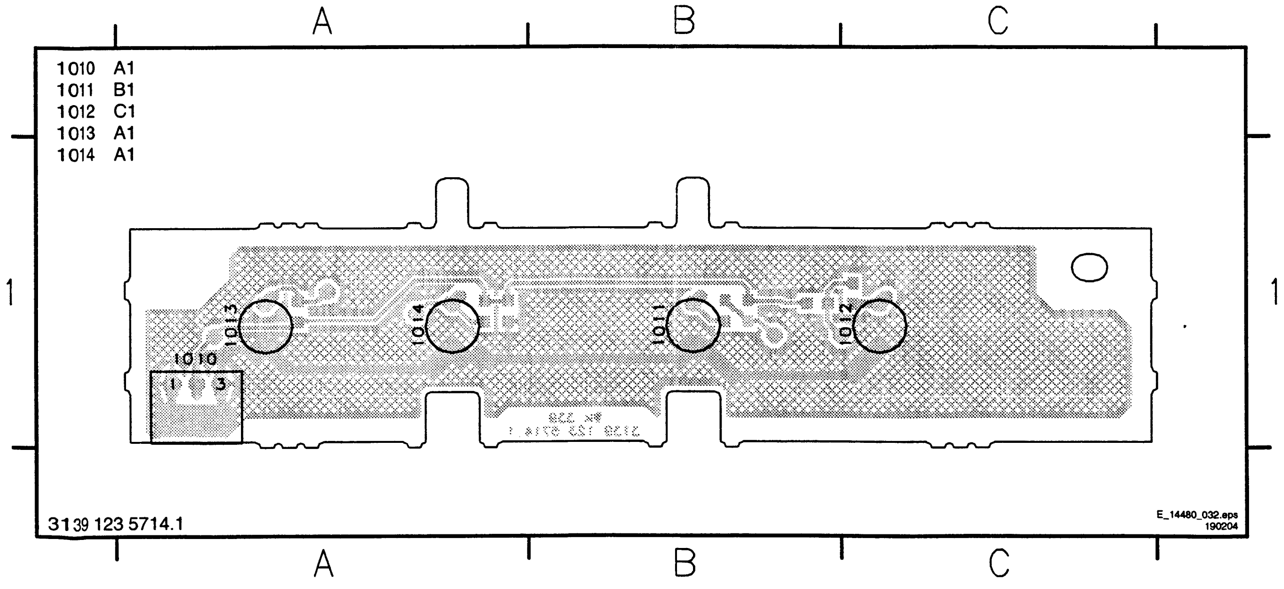
Top Control Panel (PV2)

1010 A1	1012 B3	1014 B2	3011 A2	3013 A3	3015 A3	F011 A2	I011 A2	I017 B3
1011 B3	1013 B2	3010 A2	3012 A2	3014 B3	3016 B3	F012 A3	I013 A3	I018 A3

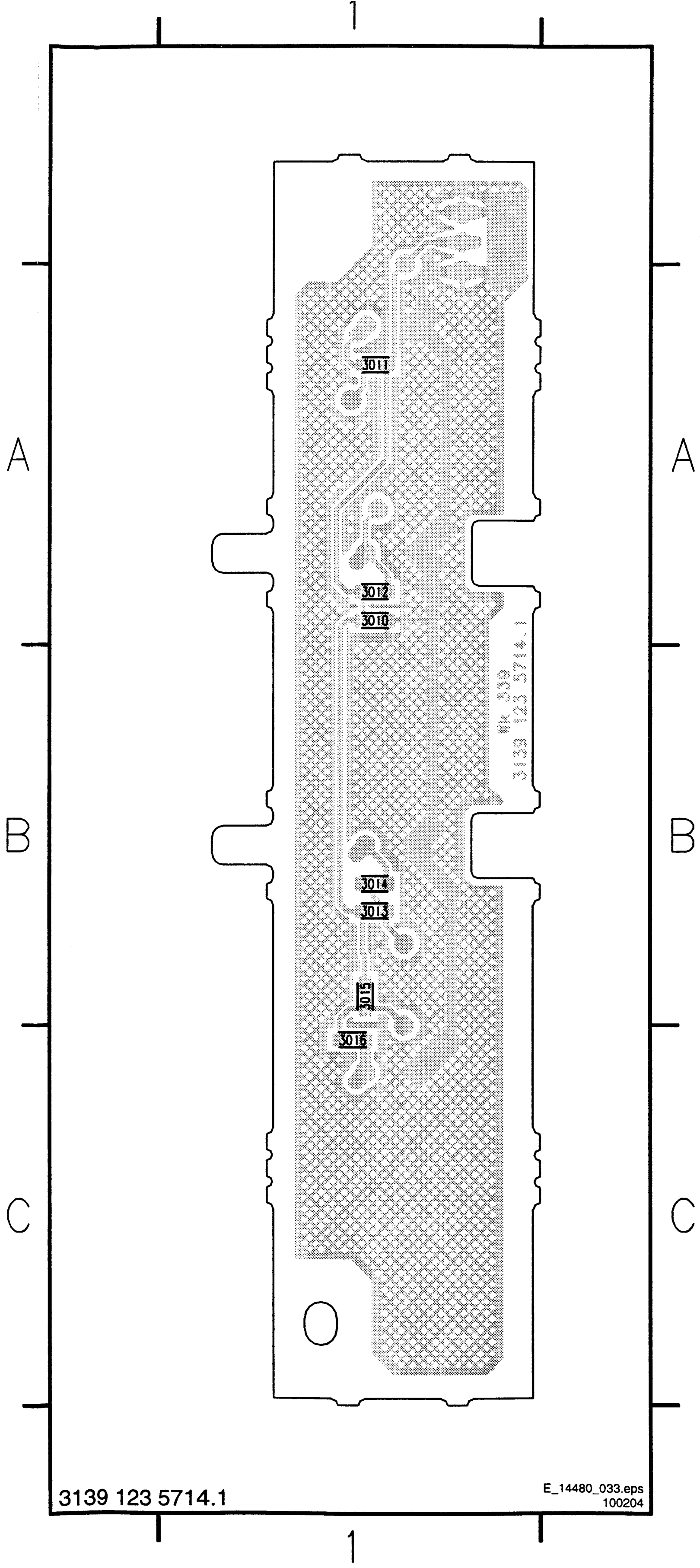

1
2
3
E TOP CONTROL (PV2)
1010
FROM 1682 OF
A4
1
2
3
KEY_PROTN
F011
3010 RES
3011 *
3012 *
3013 *
3015 *
I011
I013
F012
I018
3014 *
3016 *
1013 SKQNAB channel+
1014 SKQNAB channel-
1011 SKQNAB volume+
1012 SKQNAB volume-
I017
A
B
3139 123 5714.1
E_14480_031.eps
190204

ITEM	L03SS	L04
3011	200R	150R
3012	430R	390R
3013	2K2	1K8
3014	200R	JMP
3015	820R	820R
3016	120R	JMP

Layout Top Control Panel (PV2) (Top Side)

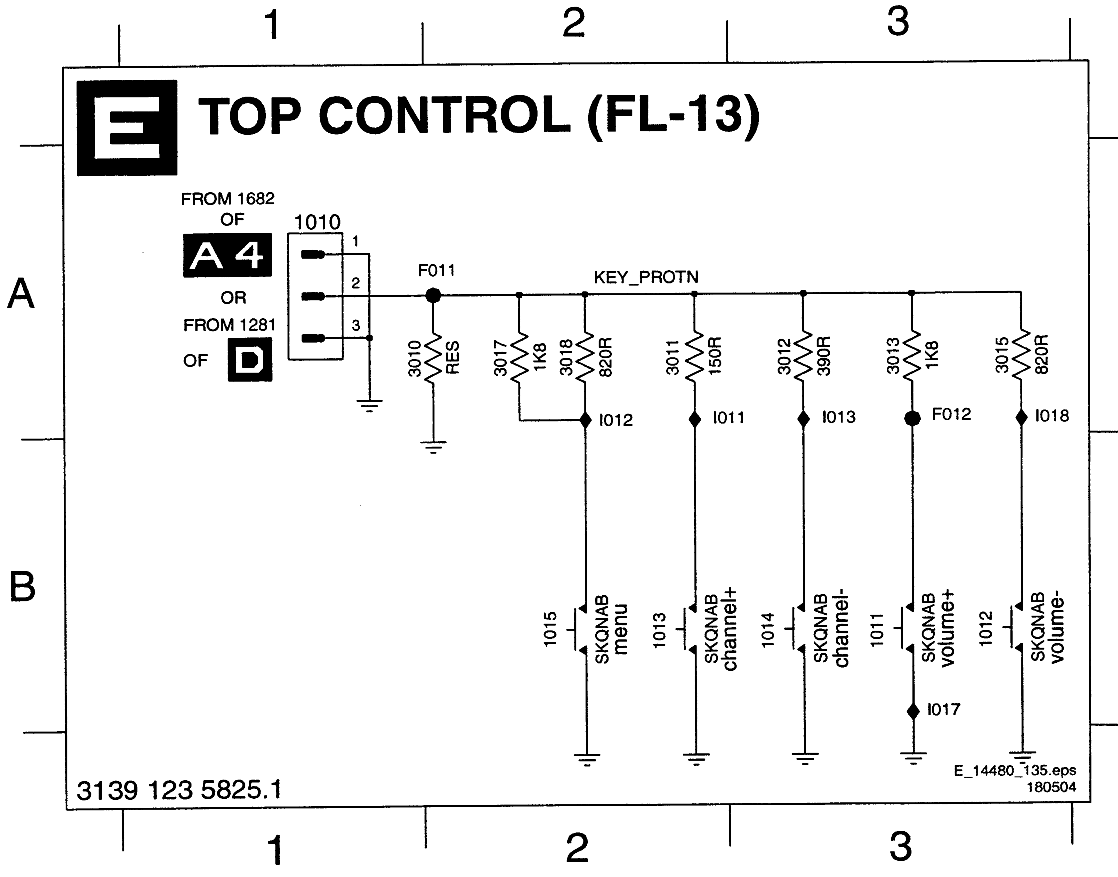

A
B
C
1
1010 A1
1011 B1
1012 C1
1013 A1
1014 A1
1013
1014
1011
1012
1010
3139 123 5714.1
E_14480_032.eps
190204

Layout Top Control Panel (PV2) (Bottom Side)


1
A
B
C
3011
3012
3010
3014
3013
3015
3016
3139 123 5714.1
E_14480_033.eps
100204

3010 A1
3011 A1
3012 A1
3013 B1
3014 B1
3015 B1
3016 C1

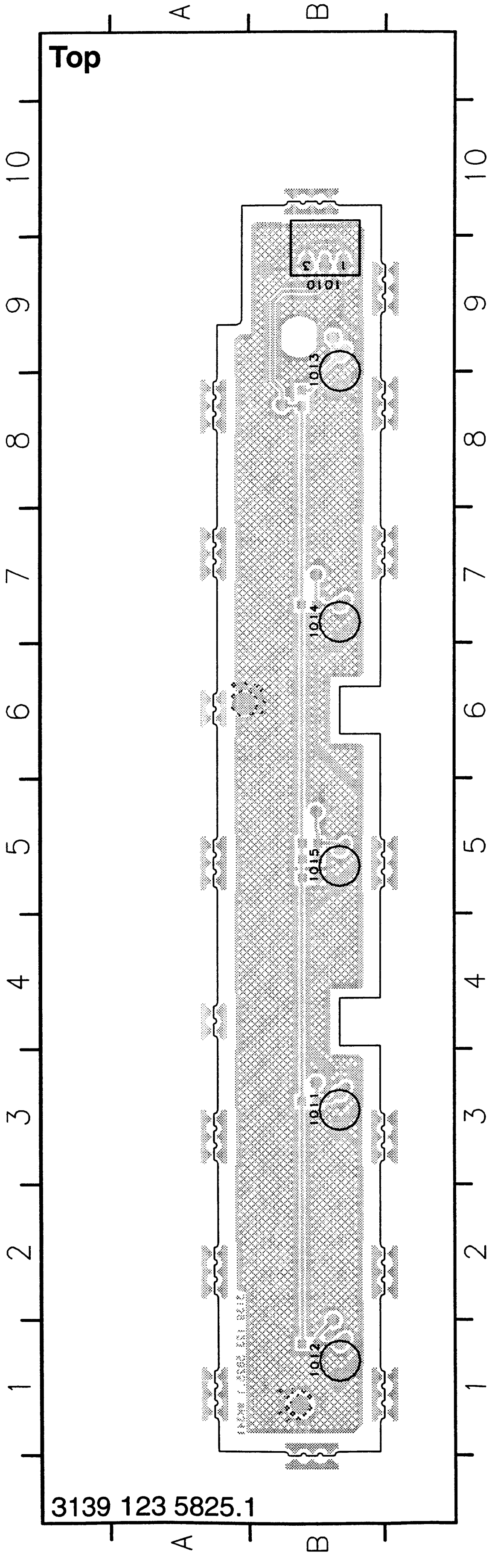
Top Control Panel (FL-13)


1
2
3
A
B
E
TOP CONTROL (FL-13)
FROM 1682 OF
A4
OR
FROM 1281
OF D
1010
1
2
3
F011
KEY_PROTN
3010 RES
3017 1K8
3018 820R
3011 150R
3012 390R
3013 1K8
3015 820R
I012
I011
I013
F012
I018
1015 SKQNAB menu
1013 SKQNAB channel+
1014 SKQNAB channel-
1011 SKQNAB volume+
1012 SKQNAB volume-
I017
3139 123 5825.1
E_14480_135.eps
180504

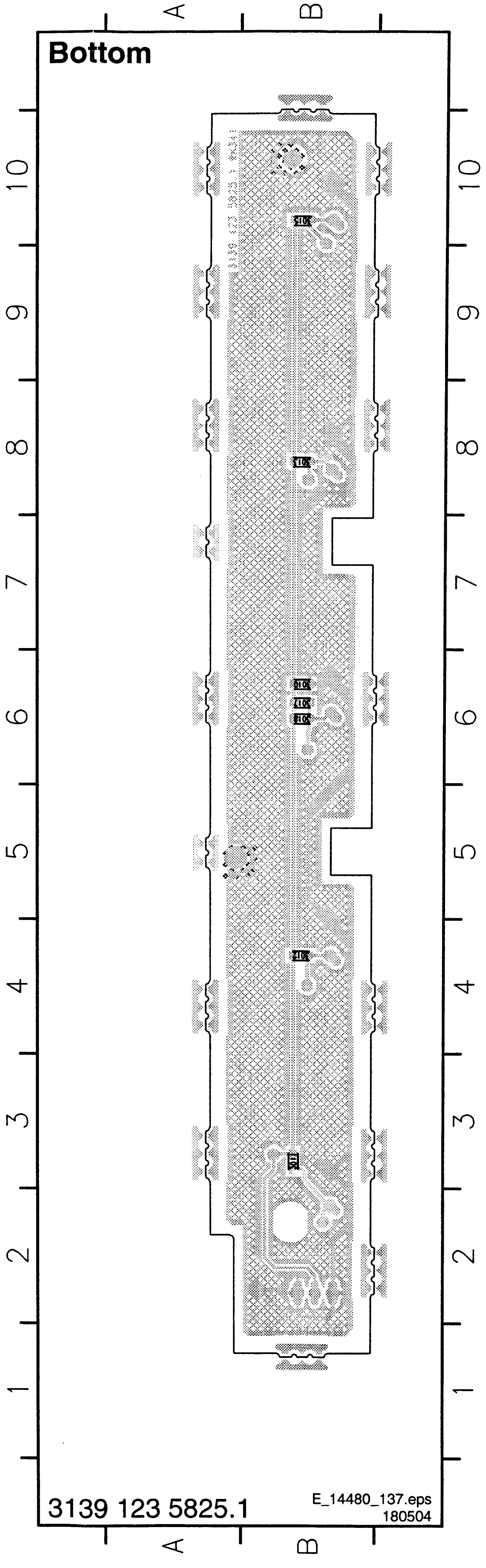
1010	A1
1011	B3
1012	B3
1013	B2
1014	B3
1015	B2
3010	A1
3011	A2
3012	A3
3013	A3
3015	A3
3017	A2
3018	A2
F011	A2
F012	A3
I011	A3
I012	A2
I013	A3
I017	B3
I018	A3

Layout Top Control Panel (FL-13)

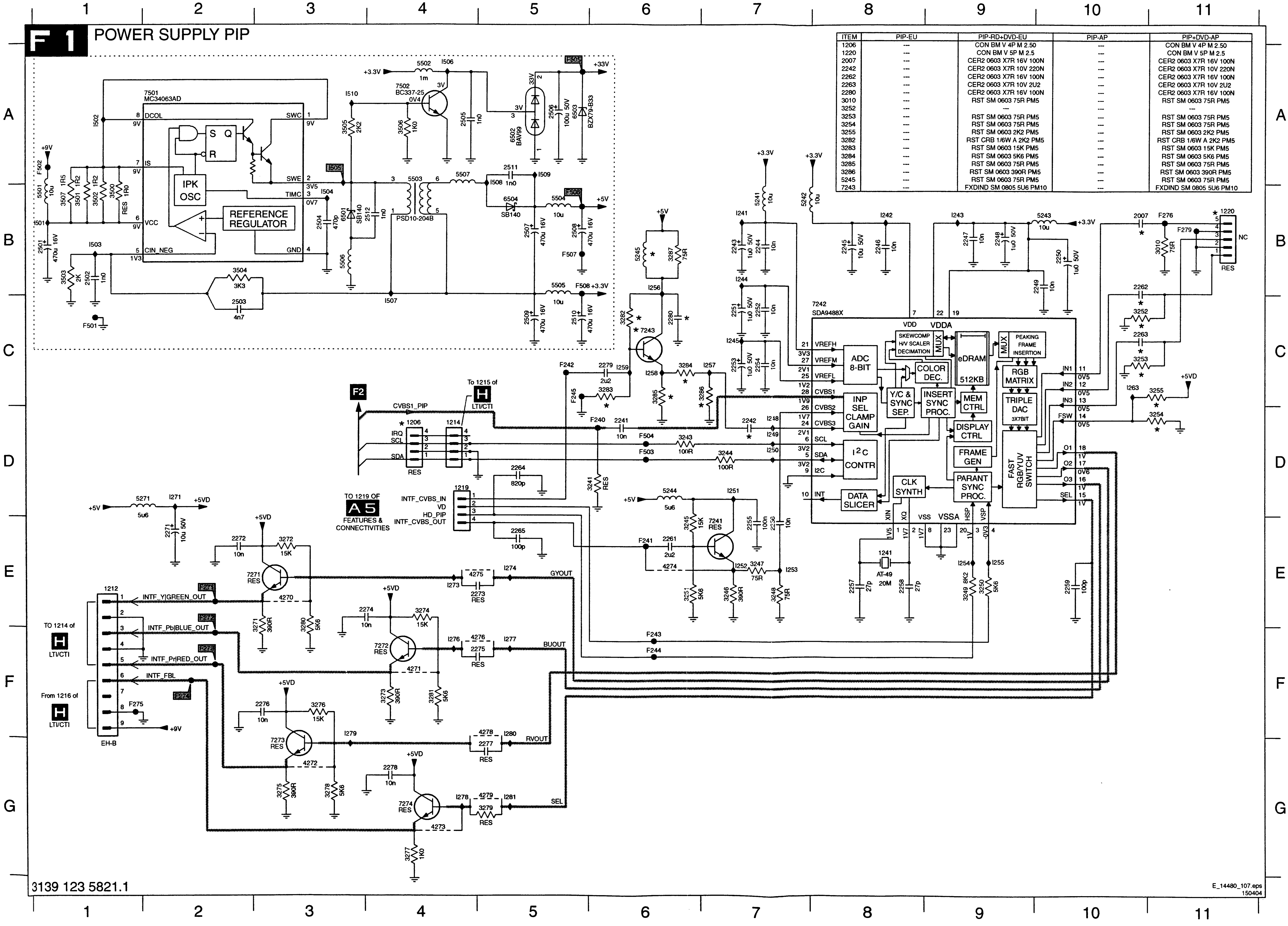
1010	B9
1011	B3
1012	B1
1013	B8
1014	B7
1015	B5


Top
A
B
1
2
3
4
5
6
7
8
9
10
1010
1013
1014
1015
1011
1012
3139 123 5825.1

3010	B6
3011	B3
3012	B4
3013	B8
3015	B10
3017	B6
3018	B6


Bottom
A
B
1
2
3
4
5
6
7
8
9
10
3139 123 5825.1
E_14480_137.eps
180504

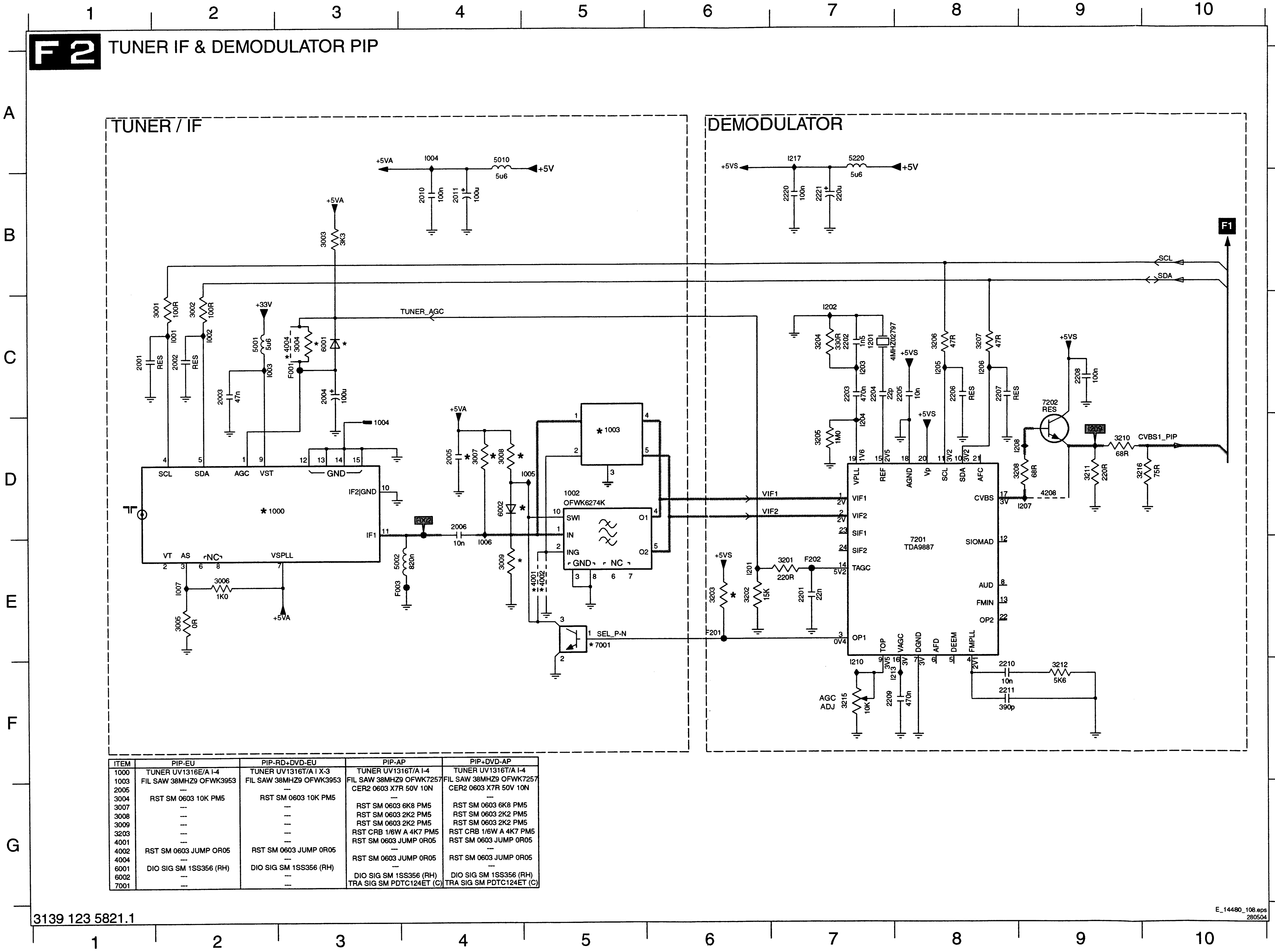
Power Supply PIP Panel


F 1
POWER SUPPLY PIP
7501
MC34063AD
DCOL
SWC
IS
SWE
TIMC
VCC
CIN_NEG
GND
IPK OSC
S Q R
REFERENCE REGULATOR
7502
BC337-25
6502
BAW99
6503
BZX79-B33
5503
PSD10-204B
6504
SB140
6501
SB140
+3.3V
+33V
+5V
+9V
+5VD
F508 +3.3V
7242
SDA9488X
VDD
VDDA
ADC 8-BIT
SKEWCOMP H/V SCALER DECIMATION
MUX
eDRAM 512KB
MUX
PEAKING FRAME INSERTION
COLOR DEC.
RGB MATRIX
INP SEL CLAMP GAIN
Y/C & SYNC SEP.
INSERT SYNC PROC.
MEM CTRL
TRIPLE DAC 3X7BIT
DISPLAY CTRL
I2C CONTR
FRAME GEN
FAST RGB/YUV SWITCH
CLK SYNTH
PARANT SYNC PROC.
DATA SLICER
VREFH
VREFM
VREFL
CVBS1
CVBS2
CVBS3
SCL
SDA
I2C
INT
XIN
XQ
VSS
VSSA
HSP
VSP
IN1
IN2
IN3
FSW
O1
O2
O3
SEL
1241
AT-49
20M
7241
7243
F2
CVBS1_PIP
To 1215 of
H
LTI/CTI
1206
1214
IRQ
SCL
SDA
RES
1219
TO 1219 OF
A5
FEATURES & CONNECTIVITIES
INTF_CVBS_IN
VD
HD_PIP
INTF_CVBS_OUT
1212
INTF_Y|GREEN_OUT
INTF_Pb|BLUE_OUT
INTF_Pr|RED_OUT
INTF_FBL
TO 1214 of
H
LTI/CTI
From 1216 of
H
LTI/CTI
EH-B
+9V
7271
7272
7273
7274
GYOUT
BUOUT
RVOUT
SEL
1220
NC
RES
3139 123 5821.1
E_14480_107.eps
150404

ITEM	PIP-EU	PIP-RD+DVD-EU	PIP-AP	PIP+DVD-AP
1206	---	CON BM V 4P M 2.50	---	CON BM V 4P M 2.50
1220	---	CON BM V 5P M 2.5	---	CON BM V 5P M 2.5
2007	---	CER2 0603 X7R 16V 100N	---	CER2 0603 X7R 16V 100N
2242	---	CER2 0603 X7R 10V 220N	---	CER2 0603 X7R 10V 220N
2262	---	CER2 0603 X7R 16V 100N	---	CER2 0603 X7R 16V 100N
2263	---	CER2 0603 X7R 10V 2U2	---	CER2 0603 X7R 10V 2U2
2280	---	CER2 0603 X7R 16V 100N	---	CER2 0603 X7R 16V 100N
3010	---	RST SM 0603 75R PM5	---	RST SM 0603 75R PM5
3252	---	---	---	---
3253	---	RST SM 0603 75R PM5	---	RST SM 0603 75R PM5
3254	---	RST SM 0603 75R PM5	---	RST SM 0603 75R PM5
3255	---	RST SM 0603 2K2 PM5	---	RST SM 0603 2K2 PM5
3282	---	RST CRB 1/6W A 2K2 PM5	---	RST CRB 1/6W A 2K2 PM5
3283	---	RST SM 0603 15K PM5	---	RST SM 0603 15K PM5
3284	---	RST SM 0603 5K6 PM5	---	RST SM 0603 5K6 PM5
3285	---	RST SM 0603 75R PM5	---	RST SM 0603 75R PM5
3286	---	RST SM 0603 390R PM5	---	RST SM 0603 390R PM5
5245	---	RST SM 0603 75R PM5	---	RST SM 0603 75R PM5
7243	---	FXDIND SM 0805 5U6 PM10	---	FXDIND SM 0805 5U6 PM10

1206	D4	4271	F4
1212	E1	4272	G3
1214	D4	4273	G4
1219	E4	4274	E6
1220	B11	4275	E4
1241	E8	4276	F5
2007	B10	4278	F5
2241	D6	4279	G5
2242	D7	5241	B7
2243	B7	5242	B7
2244	B7	5243	B10
2245	B8	5244	D6
2246	B8	5245	B6
2247	B9	5271	D2
2248	B9	5501	B1
2249	B10	5502	A4
2250	B10	5503	A4
2251	C7	5504	B5
2252	C7	5505	B5
2253	C7	5506	B3
2254	C7	5507	A4
2255	E7	6501	B3
2256	E7	6502	A5
2257	E8	6503	A5
2258	E8	6504	B5
2259	E10	7241	E7
2261	E6	7242	C8
2262	B10	7243	C6
2263	C10	7271	E3
2264	D5	7272	F4
2265	E5	7273	G3
2271	E2	7274	G4
2272	E2	7501	A2
2273	E5	7502	A4
2274	E4	F240	D6
2275	F5	F241	E6
2276	F3	F242	C5
2277	G5	F243	F6
2278	G4	F244	F6
2279	C6	F245	C5
2280	C6	F271	E2
2501	B1	F272	F2
2502	B1	F273	F2
2503	C2	F274	F2
2504	B3	F275	F1
2505	A4	F276	B11
2506	A5	F279	B11
2507	B5	F501	C1
2508	B5	F502	A1
2509	C5	F503	D6
2510	C5	F504	D6
2511	A5	F505	A5
2512	B4	F506	B5
3010	B11	F507	B5
3241	D6	F508	B5
3243	D6	I241	B7
3244	D7	I242	B8
3245	E6	I243	B9
3246	E7	I244	B7
3247	E7	I245	C7
3248	E7	I248	D7
3249	E9	I249	D7
3250	E9	I250	D7
3251	E6	I251	D7
3252	C10	I252	E7
3253	C10	I253	E7
3254	D11	I254	E9
3255	C11	I255	E9
3271	E3	I256	B6
3272	E3	I257	C7
3273	F4	I258	C6
3274	E4	I259	C6
3275	G3	I263	C10
3276	F3	I271	D2
3277	G4	I273	E4
3278	G3	I274	E5
3279	G5	I276	F4
3280	E3	I277	F5
3281	F4	I278	G4
3282	C6	I279	F3
3283	C6	I280	F5
3284	C6	I281	G5
3285	C6	I501	B1
3286	C7	I502	A1
3287	B6	I503	B1
3500	B1	I504	B3
3501	B1	I505	A3
3502	B1	I506	A4
3503	B1	I507	C4
3504	B2	I508	A5
3505	A3	I509	A5
3506	A4	I510	A3
3507	B1		
4270	E3		

Tuner IF and Demodulator PIP Panel

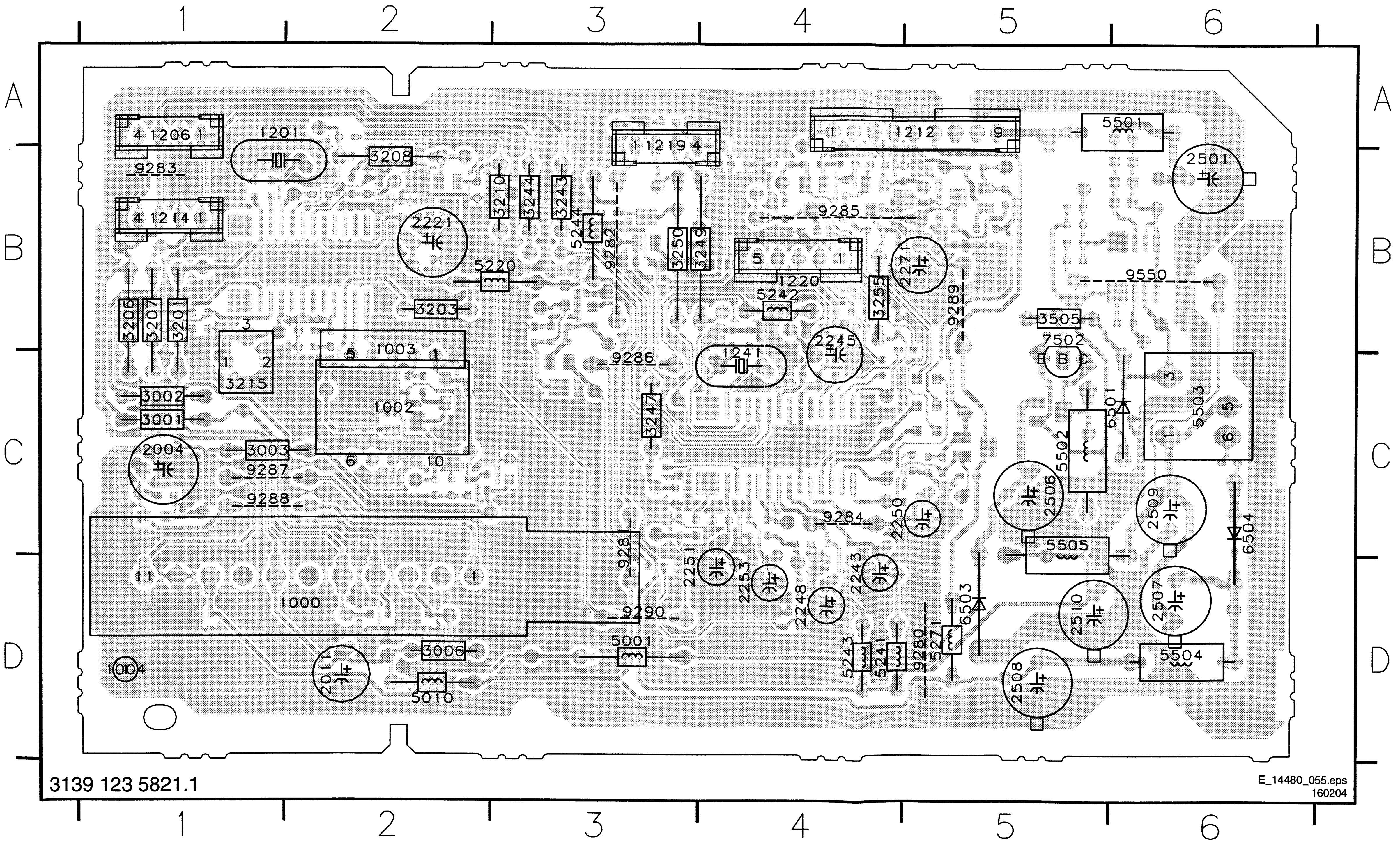

F 2
TUNER IF & DEMODULATOR PIP
TUNER / IF
DEMODULATOR
1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
+5VA
I004
5010
5u6
+5V
2010
100n
2011
100u
3003
3K3
SCL
SDA
3001
100R
3002
100R
I001
I002
2001
RES
2002
RES
+33V
5001
5u6
I003
2003
47n
4004
3004
6001
F001
2004
100u
TUNER_AGC
I004
SCL
SDA
AGC
VST
GND
IF2|GND
IF1
VT
AS
NC
VSPLL
1000
3006
1K0
I007
3005
0R
2006
10n
I006
5002
820n
F003
F002
2005
3007
3008
6002
3009
I005
1003
1002
OFWK6274K
SWI
IN
ING
O1
O2
GND
NC
4001
4002
SEL_P-N
7001
+5VS
I217
5220
5u6
2220
100n
2221
220u
F1
SCL
SDA
I202
3204
330R
2202
1n5
1201
4MHZ
2797
3206
47R
3207
47R
+5VS
I203
I205
I206
2203
470n
2204
22p
2205
10n
2206
RES
2207
RES
3205
1M0
I204
2208
100n
7202
RES
3210
68R
CVBS1_PIP
I208
3208
68R
3211
220R
3216
75R
I207
4208
VIF1
VIF2
VPLL
REF
AGND
Vp
SCL
SDA
AFC
VIF1
VIF2
SIF1
SIF2
TAGC
CVBS
SIOMAD
7201
TDA9887
AUD
FMIN
OP2
OP1
TOP
VAGC
DGND
AFD
DEEM
FMPLL
3201
220R
F202
2201
22n
I201
3203
3202
15K
F201
I210
I213
AGC ADJ
3215
10K
2209
470n
2210
10n
3212
5K6
2211
390p
3139 123 5821.1
E_14480_108.eps
280504

ITEM	PIP-EU	PIP-RD+DVD-EU	PIP-AP	PIP+DVD-AP
1000	TUNER UV1316E/A I-4	TUNER UV1316T/A I X-3	TUNER UV1316T/A I-4	TUNER UV1316T/A I-4
1003	FIL SAW 38MHZ9 OFWK3953	FIL SAW 38MHZ9 OFWK3953	FIL SAW 38MHZ9 OFWK7257	FIL SAW 38MHZ9 OFWK7257
2005	---	---	CER2 0603 X7R 50V 10N	CER2 0603 X7R 50V 10N
3004	RST SM 0603 10K PM5	RST SM 0603 10K PM5	---	---
3007	---	---	RST SM 0603 6K8 PM5	RST SM 0603 6K8 PM5
3008	---	---	RST SM 0603 2K2 PM5	RST SM 0603 2K2 PM5
3009	---	---	RST SM 0603 2K2 PM5	RST SM 0603 2K2 PM5
3203	---	---	RST CRB 1/6W A 4K7 PM5	RST CRB 1/6W A 4K7 PM5
4001	---	---	RST SM 0603 JUMP 0R05	RST SM 0603 JUMP 0R05
4002	RST SM 0603 JUMP OR05	RST SM 0603 JUMP 0R05	---	---
4004	---	---	RST SM 0603 JUMP 0R05	RST SM 0603 JUMP 0R05
6001	DIO SIG SM 1SS356 (RH)	DIO SIG SM 1SS356 (RH)	---	---
6002	---	---	DIO SIG SM 1SS356 (RH)	DIO SIG SM 1SS356 (RH)
7001	---	---	TRA SIG SM PDTC124ET (C)	TRA SIG SM PDTC124ET (C)

1000	D3
1002	D5
1003	D5
1004	D3
1201	C7
2001	C1
2002	C2
2003	C2
2004	C3
2005	D4
2006	D4
2010	B4
2011	B4
2201	E7
2202	C7
2203	C7
2204	C7
2205	C8
2206	C8
2207	C8
2208	C9
2209	F7
2210	F8
2211	F8
2220	B7
2221	B7
3001	C2
3002	C2
3003	B3
3004	C3
3005	E2
3006	E2
3007	D4
3008	D4
3009	E4
3201	E7
3202	E6
3203	E6
3204	C7
3205	D7
3206	C8
3207	C8
3208	D9
3210	D9
3211	D9
3212	F9
3215	F7
3216	D10
4001	E5
4002	E5
4004	C3
4208	D9
5001	C2
5002	E3
5010	A4
5220	A7
6001	C3
6002	D4
7001	E5
7201	E8
7202	C9
F001	C3
F002	D4
F003	E4
F201	E6
F202	E7
I001	C2
I002	C2
I003	C2
I004	A4
I005	D5
I006	E4
I007	E2
I201	E6
I202	C7
I203	C7
I204	D7
I205	C8
I206	C8
I207	D9
I208	D8
I209	D9
I210	F7
I213	F7
I217	A7

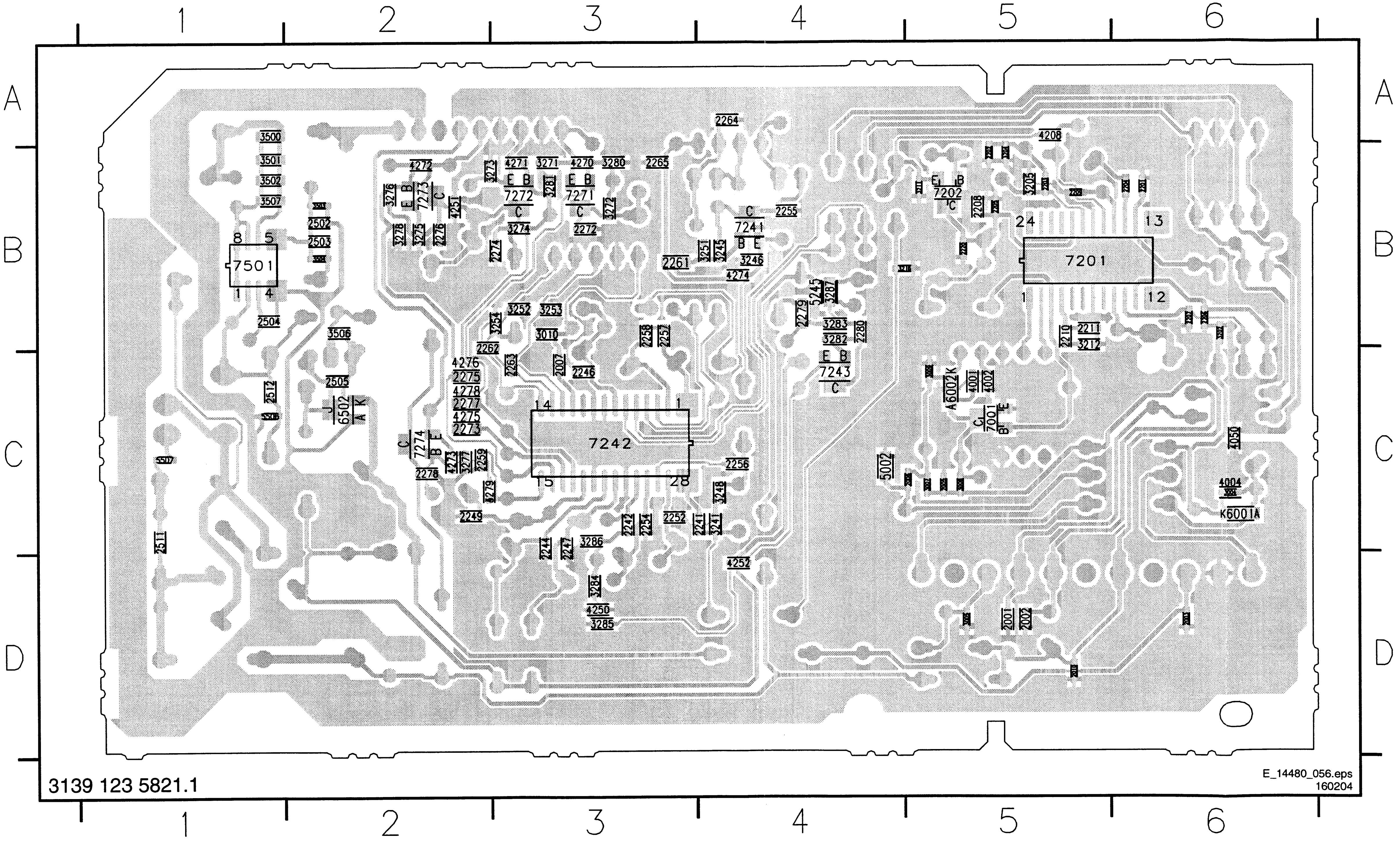
Layout PIP Panel (Top Side)

1000	D2
1002	C2
1003	C2
1004	D1
1201	A1
1206	A1
1212	A5
1214	B1
1219	A3
1220	B4
1241	C4
2004	C1
2011	D2
2221	B2
2243	D4
2245	B4
2248	D4
2250	C4
2251	D3
2253	D4
2271	B5
2501	B6
2506	C5
2507	D6
2508	D5
2509	C6
2510	D5
3001	C1
3002	C1
3003	C1
3006	D2
3201	B1
3203	B2
3206	B1
3207	B1
3208	B2
3210	B3
3215	C1
3243	B3
3244	B3
3247	C3
3249	B4
3250	B3
3255	B4
3505	B5
5001	D3
5010	D2
5220	B3
5241	D4
5242	B4
5243	D4
5244	B3
5271	D5
5501	A6
5502	C5
5503	C6
5504	D6
5505	C5
6501	C6
6503	D5
6504	C6
7502	B5
9280	D5
9281	C3
9282	B3
9283	B1
9284	C4
9285	B4
9286	C3
9287	C1
9288	C1
9289	B5
9290	D3
9550	B6

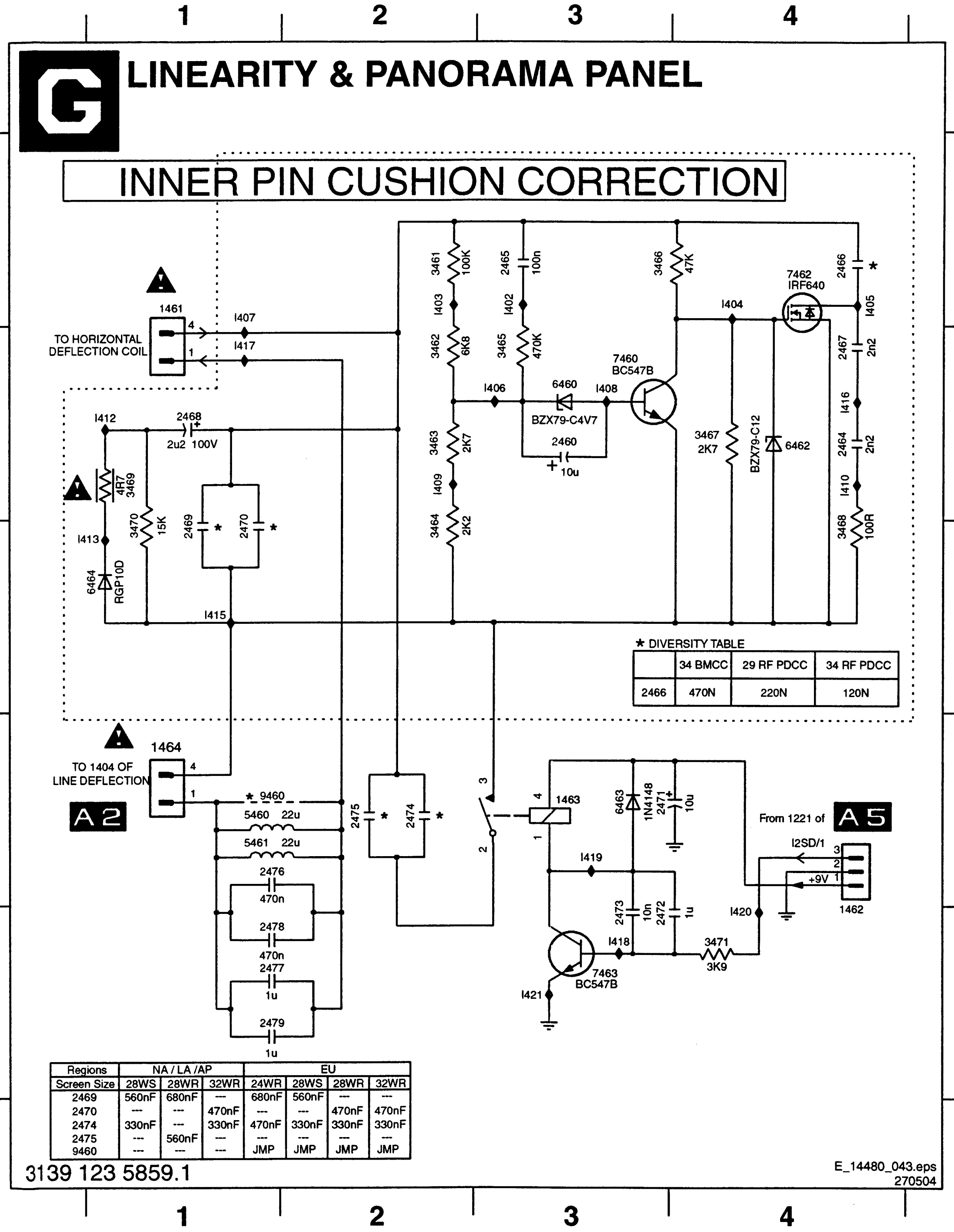

1 2 3 4 5 6
A B C D
1206
1201
3208
1219
1212
5501
2501
9283
1214
3210
3244
3243
5244
9282
3250
3249
9285
2221
5220
1220
2271
9289
9550
3206
3207
3201
3203
5242
3255
3505
7502
E B C
3215
1003
1002
9286
1241
2245
3247
6501
5503
3002
3001
2004
3003
9287
9288
5502
2506
2509
2250
9284
6504
9281
2251
2253
2243
5505
1000
11
2248
6503
2510
2507
9290
3006
5001
5243
5241
9280
5271
5504
1004
2011
5010
2508
3139 123 5821.1
E_14480_055.eps
160204

Layout PIP Panel (Bottom Side)

2001	D5	2201	B6	2208	B5	2244	C3	2256	C4	2264	A4	2277	C2	2505	C2	3009	C5	3216	B4	3253	B3	3276	B2	3283	B4	3502	B1	4004	C6	4271	B3	4279	C2	6502	C2	7271	B3
2002	D5	2202	B5	2209	B5	2246	C3	2257	B3	2265	B3	2278	C2	2511	C1	3010	B3	3241	C4	3254	B3	3277	C2	3284	D3	3503	B2	4050	C6	4272	B2	5002	C4	7001	C5	7272	B3
2003	D6	2203	B5	2210	B5	2247	C3	2258	B3	2272	B3	2279	B4	2512	C1	3202	B6	3245	B4	3271	B3	3278	B2	3285	D3	3504	B2	4208	A5	4273	C2	5245	B4	7201	B5	7273	B2
2005	C5	2204	B6	2211	B5	2249	C2	2259	C2	2273	C2	2280	B4	3004	C6	3204	B5	3246	B4	3272	B3	3279	C2	3286	C3	3506	B2	4250	D3	4274	B4	5506	C1	7202	B5	7274	C2
2006	C5	2205	B5	2220	B5	2252	C3	2261	B3	2274	B3	2502	B2	3005	D5	3205	B5	3248	C4	3273	B2	3280	B3	3287	B4	3507	B1	4251	B2	4275	C2	5507	C1	7241	B4	7501	B1
2007	C3	2206	B6	2241	C4	2254	C3	2262	B2	2275	C2	2503	B2	3007	C5	3211	B5	3251	B4	3274	B3	3281	B3	3500	A1	4001	C5	4252	D4	4276	C2	6001	C6	7242	C3		
2010	D5	2207	B6	2242	C3	2255	B4	2263	C3	2276	B2	2504	B1	3008	C5	3212	B5	3252	B3	3275	B2	3282	B4	3501	B1	4002	C5	4270	B3	4278	C2	6002	C5	7243	C4		


1
2
3
4
5
6
A
B
C
D
3500
3501
3502
3507
2502
2503
7501
8
5
1
4
2504
3506
2505
2512
6502
A
K
2511
4272
3276
7273
E
B
C
3278
3275
2276
4251
3273
4271
7272
3274
3271
3281
4270
7271
2272
3272
3280
2265
2274
2264
2255
7241
3251
3245
3246
4274
2261
3252
3253
3254
3010
2262
4276
2275
4278
2277
4275
2273
2263
2007
2246
2258
2252
7274
2278
3273
3277
2259
3279
7242
14
1
15
28
2256
3248
2249
2242
2254
2252
2241
3241
2244
2247
3286
4252
3284
4250
3285
5245
3287
2279
3283
3282
2280
7243
4208
7202
3205
2208
24
13
7201
12
2210
2211
3212
A6002K
4001
4002
7001
5002
4050
4004
K6001A
2001
2002
3139 123 5821.1
E_14480_056.eps
160204

Linearity & Panorama Panel


1
2
3
4
A
B
C
D
E
G
LINEARITY & PANORAMA PANEL
INNER PIN CUSHION CORRECTION
TO HORIZONTAL DEFLECTION COIL
1461
I407
I417
I412
2468
2u2 100V
4R7
3469
3470
15K
2469
2470
I413
6464
RGP10D
I415
TO 1404 OF LINE DEFLECTION
1464
A2
9460
5460 22u
5461 22u
2476
470n
2478
470n
2477
1u
2479
1u
3461
100K
I403
3462
6K8
3463
2K7
I409
3464
2K2
2465
100n
I402
3465
470K
I406
6460
BZX79-C4V7
2460
10u
I408
7460
BC547B
3466
47K
I404
7462
IRF640
2466
I405
2467
2n2
I416
2464
2n2
I410
3468
100R
3467
2K7
BZX79-C12
6462
2475
2474
1463
6463
1N4148
2471
10u
I419
2473
10n
2472
1u
I418
7463
BC547B
I421
3471
3K9
I420
From 1221 of
A5
I2SD/1
+9V
1462
3139 123 5859.1
E_14480_043.eps
270504

★ DIVERSITY TABLE

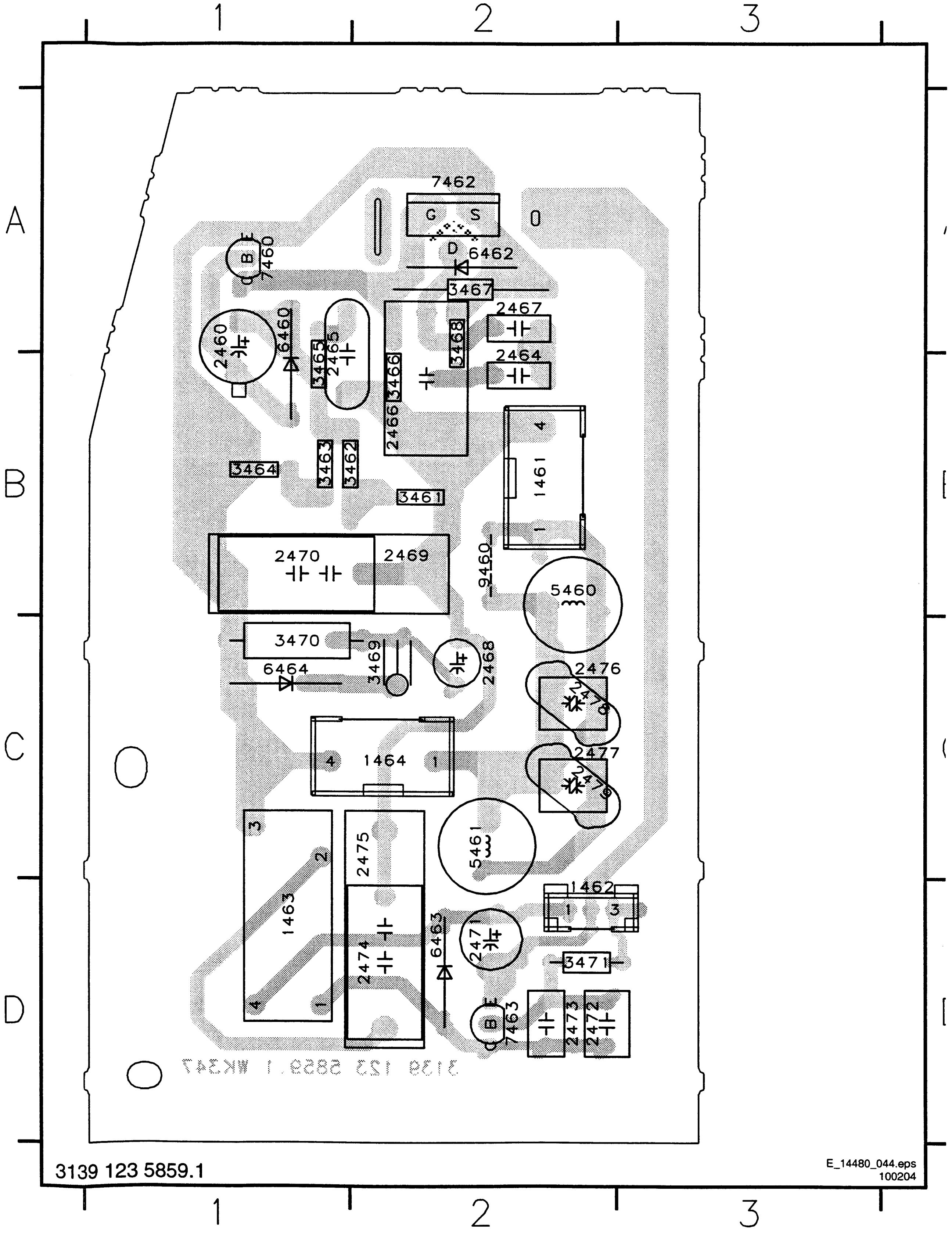
	34 BMCC	29 RF PDCC	34 RF PDCC
2466	470N	220N	120N

Regions	NA / LA /AP			EU			
Screen Size	28WS	28WR	32WR	24WR	28WS	28WR	32WR
2469	560nF	680nF	---	680nF	560nF	---	---
2470	---	---	470nF	---	---	470nF	470nF
2474	330nF	---	330nF	470nF	330nF	330nF	330nF
2475	---	560nF	---	---	---	---	---
9460	---	---	---	JMP	JMP	JMP	JMP

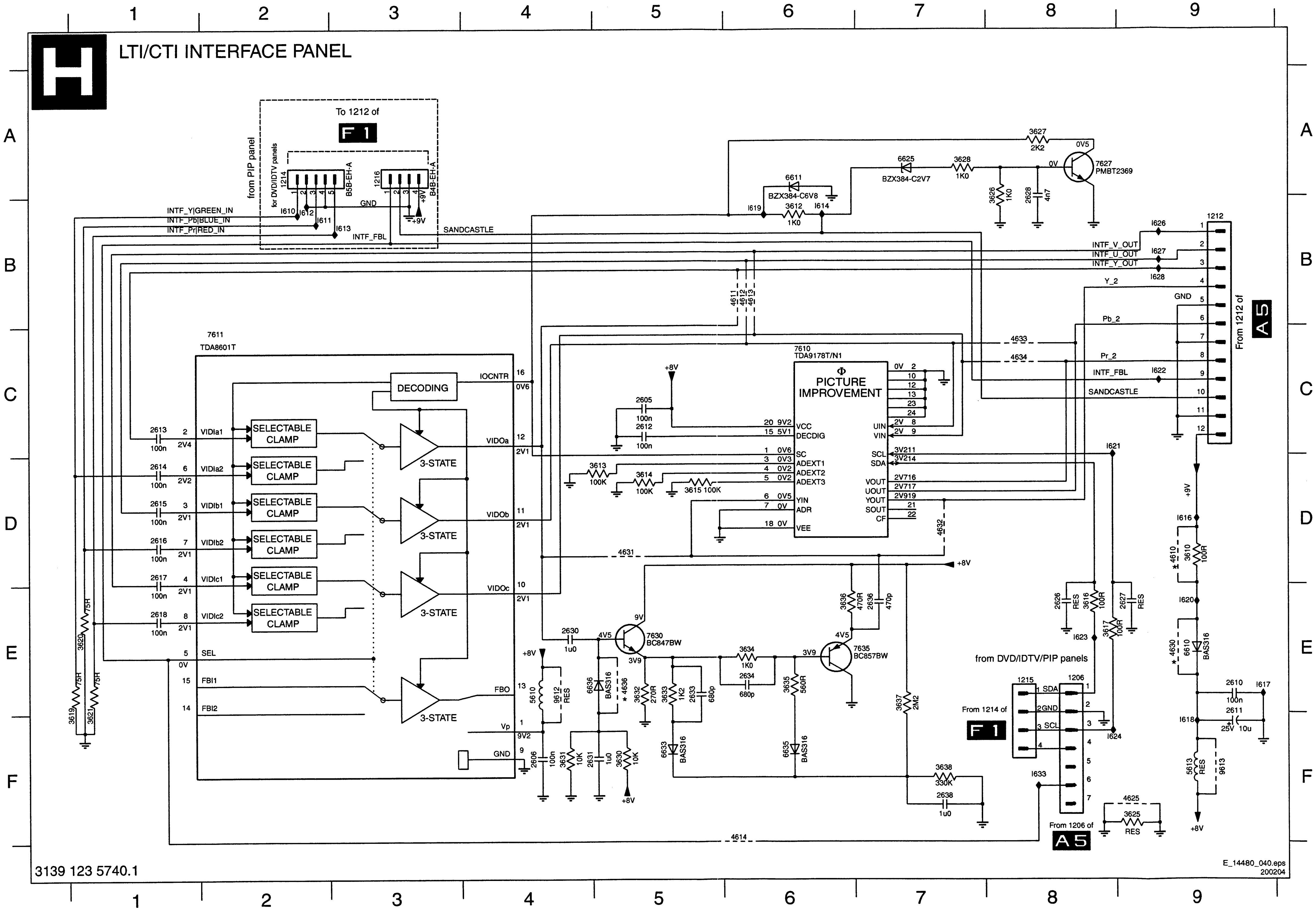
1461	A1
1462	D4
1463	D3
1464	D1
2460	B3
2464	B4
2465	A3
2466	A4
2467	B4
2468	B1
2469	C1
2470	C1
2471	D3
2472	E3
2473	E3
2474	D2
2475	D2
2476	D1
2477	E1
2478	E1
2479	E1
3461	A2
3462	B2
3463	B2
3464	C2
3465	B3
3466	A3
3467	B4
3468	C4
3469	B1
3470	C1
3471	E4
5460	D1
5461	D1
6460	B3
6462	B4
6463	D3
6464	C1
7460	B3
7462	A4
7463	E3
9460	D1
I402	A3
I403	A2
I404	A4
I405	A4
I406	B3
I407	A1
I408	B3
I409	B2
I410	B4
I412	B1
I413	C1
I415	C1
I416	B4
I417	B1
I418	E3
I419	D3
I420	E4
I421	E3

Layout Linearity & Panorama Panel (Top Side)

1461	B2	2464	B2	2469	B2	2474	D2	2479	C2	3465	B1	3470	C1	6461	A2	7462	D2
1462	D2	2465	B1	2470	B1	2475	C2	3461	B2	3466	B2	3471	D2	6462	D2	9460	B2
1463	D1	2466	B2	2471	D2	2476	C2	3462	B1	3467	A2	5460	B2	6463	C1		
1464	C2	2467	A2	2472	D2	2477	C2	3463	B1	3468	A2	5461	C2	7460	A1		
2460	A1	2468	C2	2473	D2	2478	C2	3464	B1	3469	C2	6460	A1	7461	A2		


1
2
3
A
B
C
D
7462
G
S
D
6462
7460
B
3467
2467
2464
2460
6460
3465
2465
3466
3468
2466
4
1461
3464
3463
3462
3461
2470
2469
9460
5460
3470
3469
2468
6464
2476
2477
1464
4
1
3
2
1463
2475
5461
1462
1
3
2474
6463
2471
3471
7463
2473
2472
3139 123 5859.1
E_14480_044.eps
100204

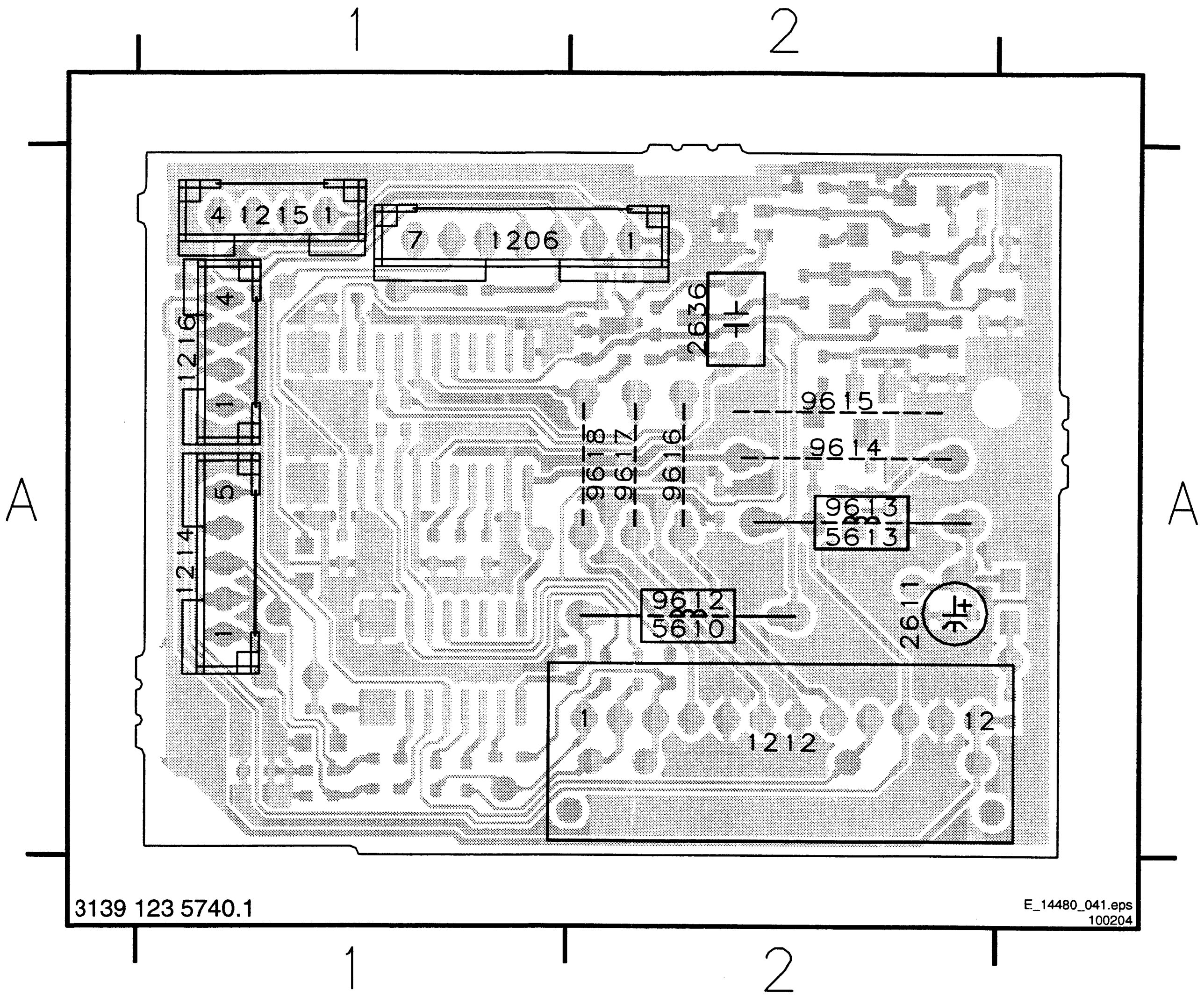
LTI/CTI Interface Panel


H
LTI/CTI INTERFACE PANEL
To 1212 of
F 1
from PIP panel
for DVD/IDTV panels
1214
B5B-EH-A
1216
B4B-EH-A
+9V
GND
INTF_Y|GREEN_IN
INTF_Pb|BLUE_IN
INTF_Pr|RED_IN
INTF_FBL
SANDCASTLE
I610
I611
I612
I613
6611
BZX384-C6V8
I619
3612
1K0
I614
6625
BZX384-C2V7
3628
1K0
3627
2K2
0V5
0V
7627
PMBT2369
3626
1K0
2628
4n7
1212
I626
I627
I628
INTF_V_OUT
INTF_U_OUT
INTF_Y_OUT
Y_2
GND
Pb_2
Pr_2
INTF_FBL
I622
SANDCASTLE
From 1212 of
A5
4611
4612
4613
4633
4634
7611
TDA8601T
DECODING
IOCNTR
0V6
SELECTABLE CLAMP
3-STATE
VIDIa1
VIDIa2
VIDIb1
VIDIb2
VIDIc1
VIDIc2
VIDOa
VIDOb
VIDOc
2V1
2613
2614
2615
2616
2617
2618
100n
2V4
2V2
SEL
FBI1
FBI2
FBO
Vp
9V2
GND
7610
TDA9178T/N1
Φ
PICTURE IMPROVEMENT
+8V
2605
100n
2612
100n
VCC
DECDIG
SC
ADEXT1
ADEXT2
ADEXT3
YIN
ADR
VEE
UIN
VIN
SCL
SDA
VOUT
UOUT
YOUT
SOUT
CF
3V211
3V214
2V716
2V717
2V919
3613
100K
3614
100K
3615 100K
4631
4632
I621
+8V
3636
470R
2636
470p
9V
4V5
2630
1u0
7630
BC847BW
3V9
3634
1K0
2634
680p
7635
BC857BW
3632
270R
3633
1K2
2633
680p
3635
560R
6633
BAS316
6635
BAS316
3637
2M2
3638
330K
2638
1u0
5610
9612
RES
6636
BAS316
4636
2606
100n
3631
10K
2631
1u0
3630
10K
from DVD/IDTV/PIP panels
From 1214 of
F 1
1215
1206
SDA
GND
SCL
I633
I623
I624
2626
RES
3616
100R
3617
100R
2627
RES
From 1206 of
A5
4625
3625
RES
+9V
I616
4610
3610
100R
I620
4630
6610
BAS316
2610
100n
I617
2611
25V 10u
I618
5613
RES
9613
4614
3620
75R
3619
75R
3621
75R
3139 123 5740.1
E_14480_040.eps
200204

1206	E8
1212	B9
1214	A2
1215	E8
1216	A3
2605	C5
2606	F4
2610	E9
2611	E9
2612	C5
2613	C1
2614	D1
2615	D1
2616	D1
2617	D1
2618	E1
2626	E8
2627	E9
2628	A8
2630	E4
2631	F4
2633	E5
2634	E6
2636	E7
2638	F7
3610	D9
3612	B6
3613	D5
3614	D5
3615	D5
3616	E8
3617	E8
3619	E1
3620	E1
3621	E1
3625	F9
3626	A8
3627	A8
3628	A7
3630	F5
3631	F4
3632	E5
3633	E5
3634	E6
3635	E6
3636	E6
3637	E7
3638	F7
4610	D9
4611	B6
4612	B6
4613	B6
4614	F6
4625	F9
4630	E9
4631	D5
4632	D7
4633	C8
4634	C8
4636	E5
5610	E4
5613	F9
6610	E9
6611	A6
6625	A7
6633	F5
6635	F6
6636	E4
7610	C6
7611	C2
7627	A8
7630	E5
7635	E6
9612	E4
9613	F9
I610	B2
I611	B2
I612	B2
I613	B3
I614	B6
I616	D9
I617	E9
I618	F9
I619	B6
I620	E9
I621	C8
I622	C9
I623	E8
I624	F8
I626	B9
I627	B9
I628	B9
I633	F8

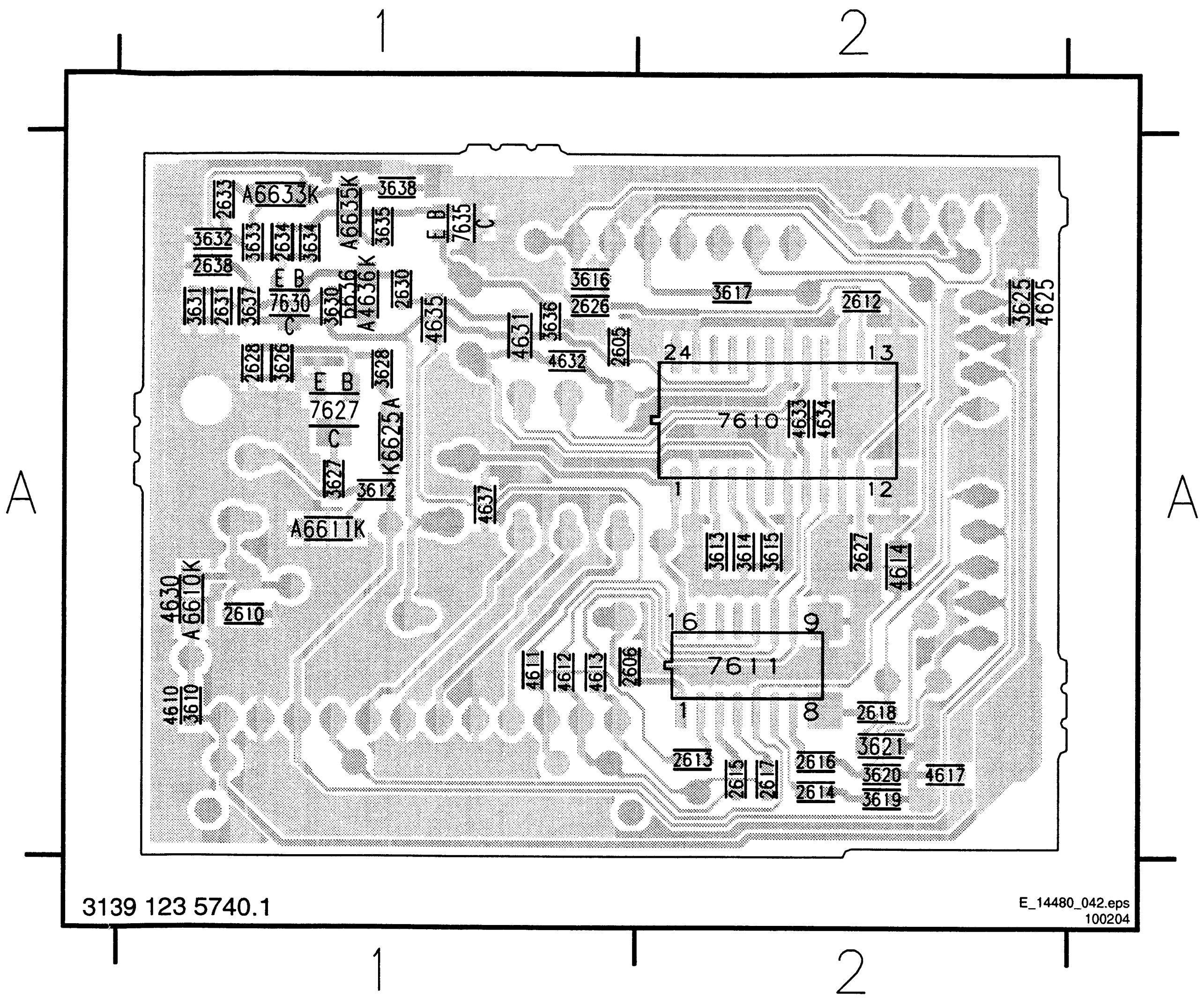
Layout LTI/CTI Interface Panel (Top Side)

1206	A1	1216	A1	5613	A2	9615	A2
1212	A2	2611	A2	9612	A2	9616	A2
1214	A1	2636	A2	9613	A2	9617	A2
1215	A1	5610	A2	9614	A2	9618	A2

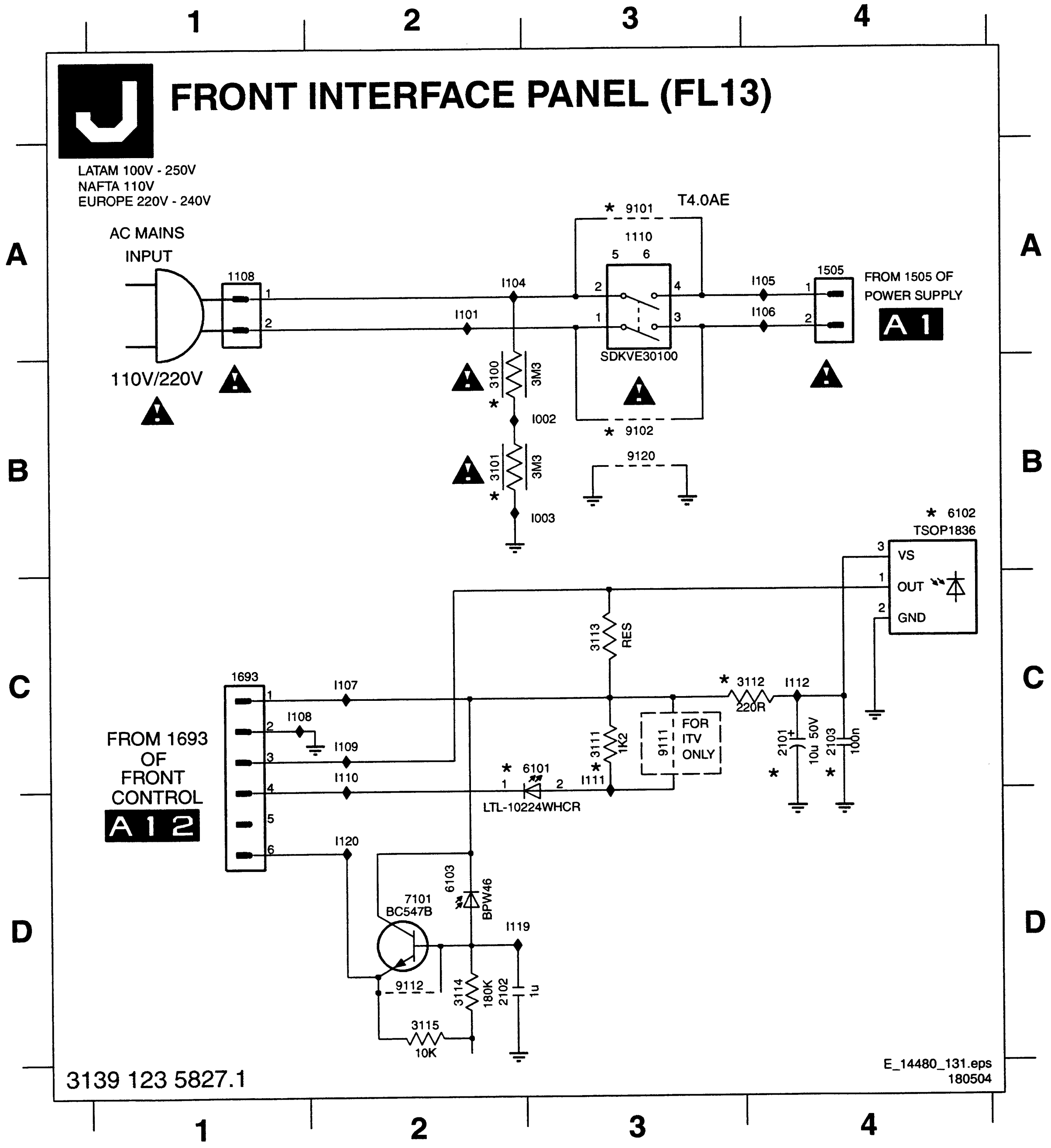

1
2
A
4 1215 1
7 1206 1
2636
4 1216 1
5 1214 1
9615
9614
9618
9617
9616
9613
5613
9612
5610
2611
1 1212 12
3139 123 5740.1
E_14480_041.eps
100204

Layout LTI/CTI Interface Panel (Bottom Side)

2605	A1	2616	A2	2631	A1	3614	A2	3625	A2	3633	A1	4611	A1	4631	A1	6610	A1	7611	A2
2606	A1	2617	A2	2633	A1	3615	A2	3626	A1	3634	A1	4612	A1	4632	A1	6611	A1	7627	A1
2610	A1	2618	A2	2634	A1	3616	A1	3627	A1	3635	A1	4613	A1	4633	A2	6625	A1	7630	A1
2612	A2	2626	A1	2638	A1	3617	A2	3628	A1	3636	A1	4614	A2	4634	A2	6633	A1	7635	A1
2613	A2	2627	A2	3610	A1	3619	A2	3630	A1	3637	A1	4617	A2	4635	A1	6635	A1		
2614	A2	2628	A1	3612	A1	3620	A2	3631	A1	3638	A1	4625	A2	4636	A1	6636	A1		
2615	A2	2630	A1	3613	A2	3621	A2	3632	A1	4610	A1	4630	A1	4637	A1	7610	A2		

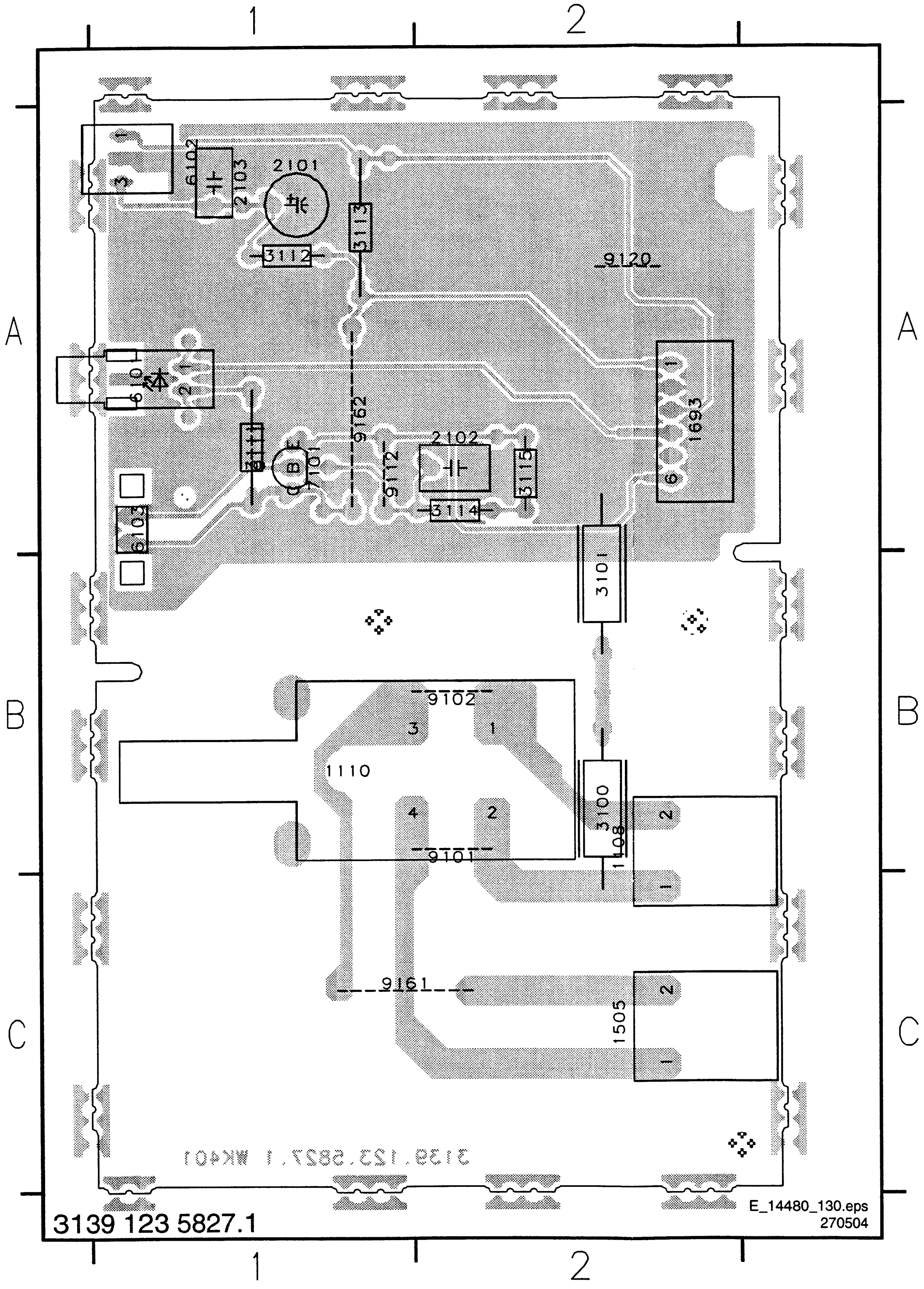

1
2
A
2633
A6633K
3638
A6635K
E B 7635 C
3632
2638
E B 7630 C
A4636K
2630
4635
3616
2626
3617
2612
3625
4625
4631
3636
2605
4632
24
13
7610
4633
4634
1
12
E B 7627 C
6625
3628
3627
3612
4637
A6611K
3613
3614
3615
2627
4614
4630
A6610K
2610
16
9
7611
8
4611
4612
4613
2606
4610
3610
2618
3621
2613
2615
2617
2616
2614
3620
3619
4617
3139 123 5740.1
E_14480_042.eps
100204

Front Interface Panel (FL-13)


J
FRONT INTERFACE PANEL (FL13)
LATAM 100V - 250V
NAFTA 110V
EUROPE 220V - 240V
AC MAINS
INPUT
110V/220V
1108
1110
T4.0AE
9101
SDKVE30100
9102
9120
1505
FROM 1505 OF POWER SUPPLY
A1
3100 3M3
3101 3M3
I002
I003
I101
I104
I105
I106
6102
TSOP1836
VS
OUT
GND
1693
FROM 1693 OF FRONT CONTROL
A12
I107
I108
I109
I110
I111
I112
I119
I120
3113 RES
3112 220R
3111 1K2
9111 FOR ITV ONLY
2101 10u 50V
2103 100n
6101
LTL-10224WHCR
6103 BPW46
7101 BC547B
9112
3114 180K
2102 1u
3115 10K
3139 123 5827.1
E_14480_131.eps
180504

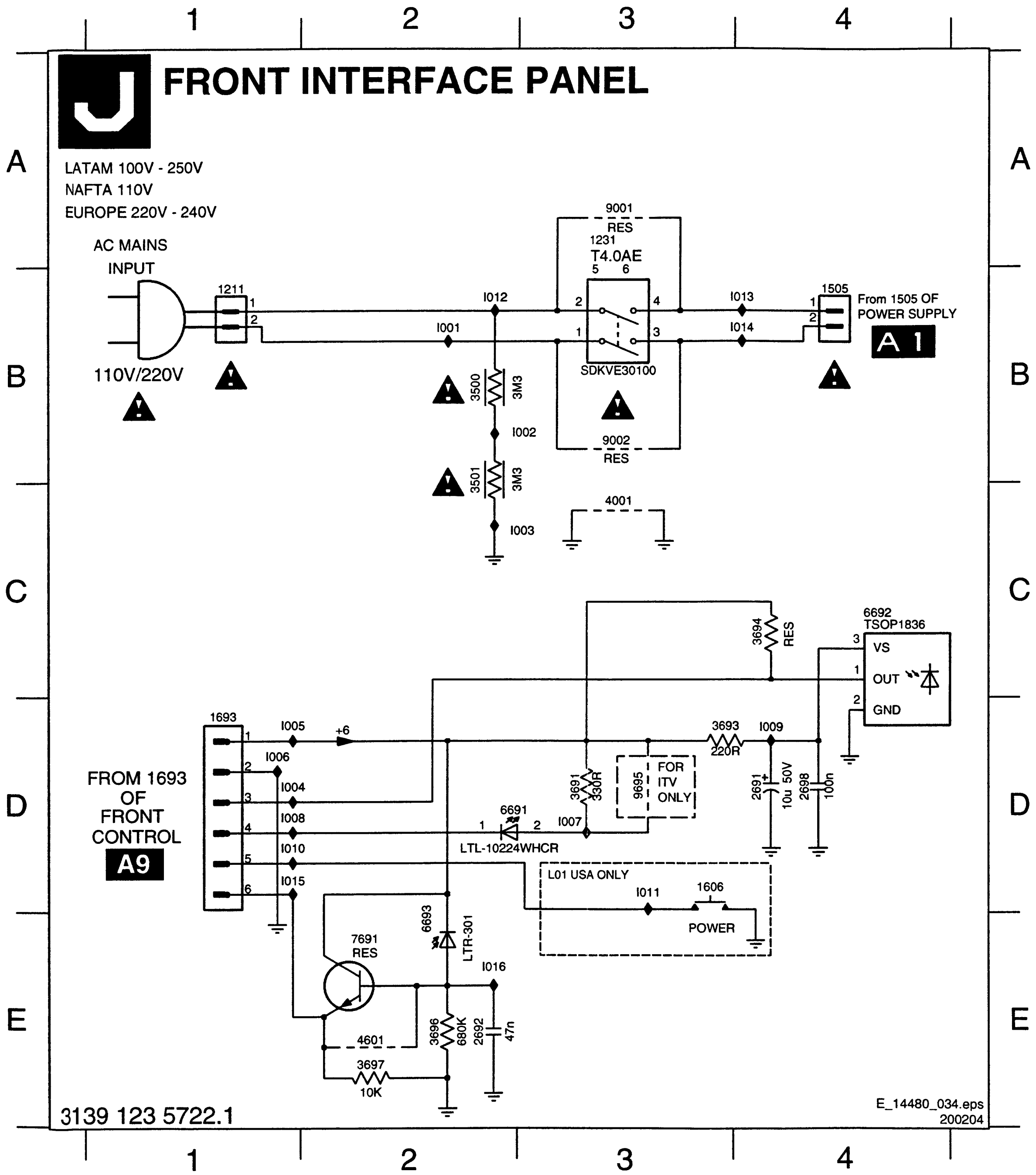
1108	A1
1110	A3
1505	A4
1693	C1
2101	C4
2102	D2
2103	C4
3100	B2
3101	B2
3111	C3
3112	C4
3113	C3
3114	D2
3115	D2
6101	C3
6102	B4
6103	D2
7101	D2
9101	A3
9102	B3
9111	C3
9112	D2
9120	B3
I002	B3
I003	B3
I101	A2
I104	A2
I105	A4
I106	A4
I107	C2
I108	C1
I109	C2
I110	C2
I111	C3
I112	C4
I119	D2
I120	D2

Layout Front Interface Panel (FL-13) (Top Side)


6102
2103
2101
3112
3113
9120
6101
1693
9162
3111
7101
9112
2102
3115
3114
6103
3101
9102
1110
9101
3100
1108
9161
1505
3139 123 5827.1
E_14480_130.eps
270504

1108	B2
1110	B1
1505	C2
1693	A2
2101	A1
2102	A2
2103	A1
3100	B2
3101	B2
3111	A1
3112	A1
3113	A1
3114	A2
3115	A2
6101	A1
6102	A1
6103	A1
7101	A1
9101	B2
9102	B2
9111	A1
9112	A1
9120	A2
9161	C1
9162	A1

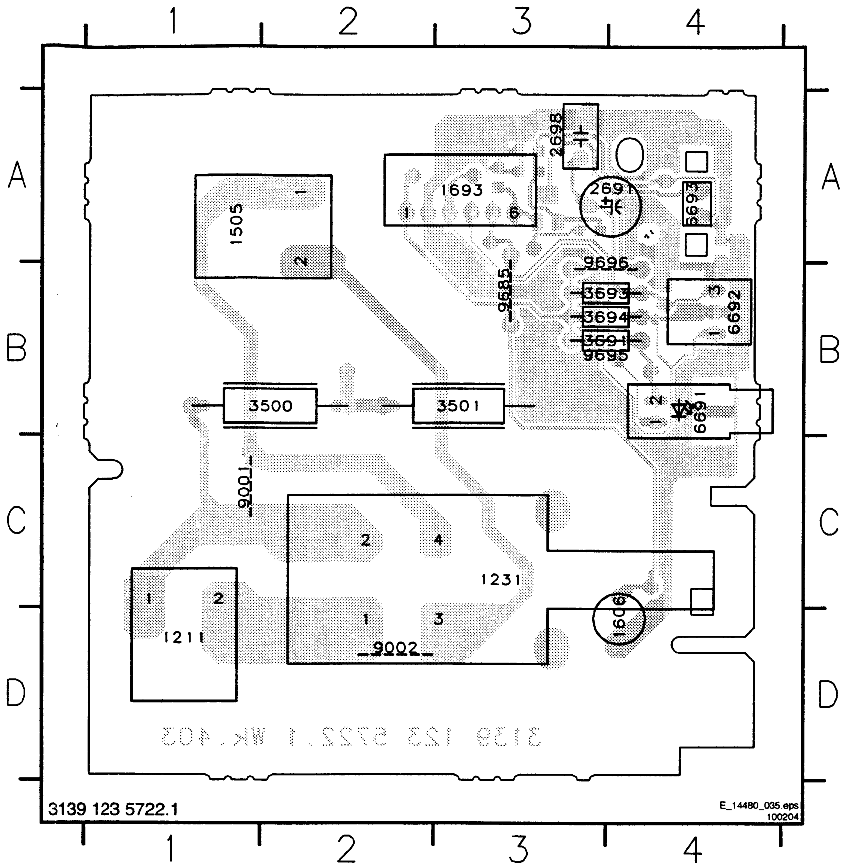
Front Interface Panel (PV-2)


J
FRONT INTERFACE PANEL
LATAM 100V - 250V
NAFTA 110V
EUROPE 220V - 240V
AC MAINS INPUT
110V/220V
1211
I001
I012
3500 3M3
I002
3501 3M3
I003
9001 RES
1231 T4.0AE
SDKVE30100
9002 RES
4001
I013
I014
1505
From 1505 OF POWER SUPPLY
A1
3694 RES
6692 TSOP1836
VS
OUT
GND
1693
I005
+6
I006
I004
I008
I010
I015
FROM 1693 OF FRONT CONTROL
A9
3693 220R
I009
3691 330R
9695 FOR ITV ONLY
2691 10u 50V
2698 100n
6691
LTL-10224WHCR
I007
L01 USA ONLY
I011
1606
POWER
7691 RES
6693 LTR-301
I016
4601
3697 10K
3696 680K
2692 47n
3139 123 5722.1
E_14480_034.eps 200204
1 2 3 4
A B C D E

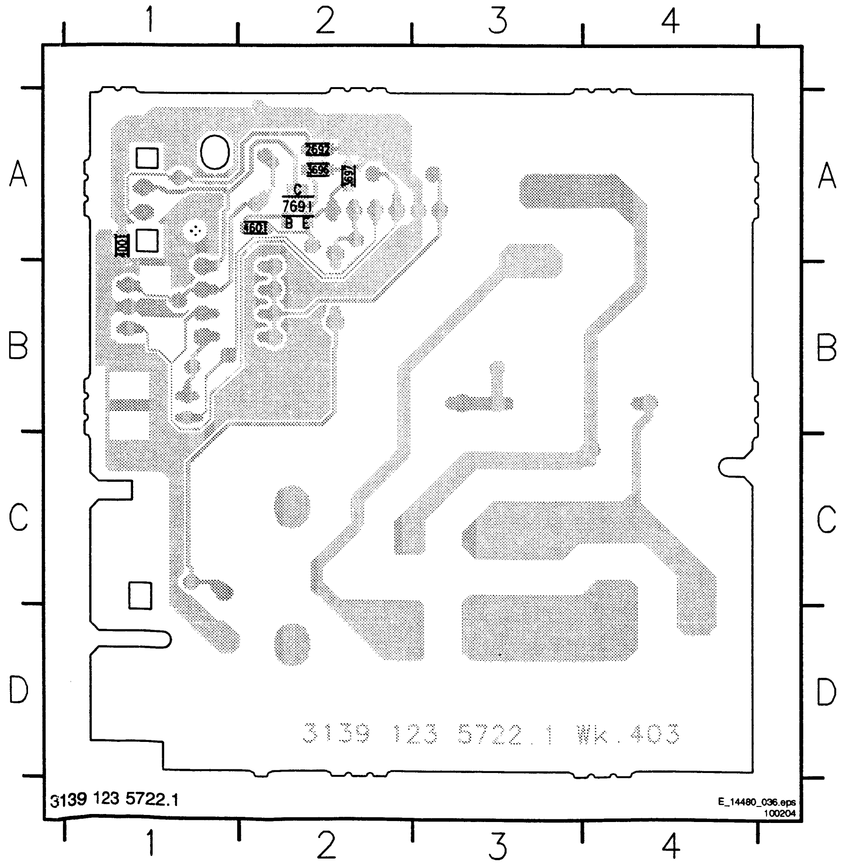
1211	B1
1231	A3
1505	B4
1606	D3
1693	D1
2691	D4
2692	E2
2698	D4
3500	B2
3501	B2
3691	D3
3693	D3
3694	C4
3696	E2
3697	E2
4001	C3
4601	E2
6691	D3
6692	C4
6693	E2
7691	E2
9001	A3
9002	B3
9695	D3
I001	B2
I002	B3
I003	C3
I004	D1
I005	D1
I006	D1
I007	D3
I008	D1
I009	D4
I010	D1
I011	D3
I012	B2
I013	B4
I014	B4
I015	D1
I016	E2

Layout Front Interface Panel (PV-2) (Top Side)

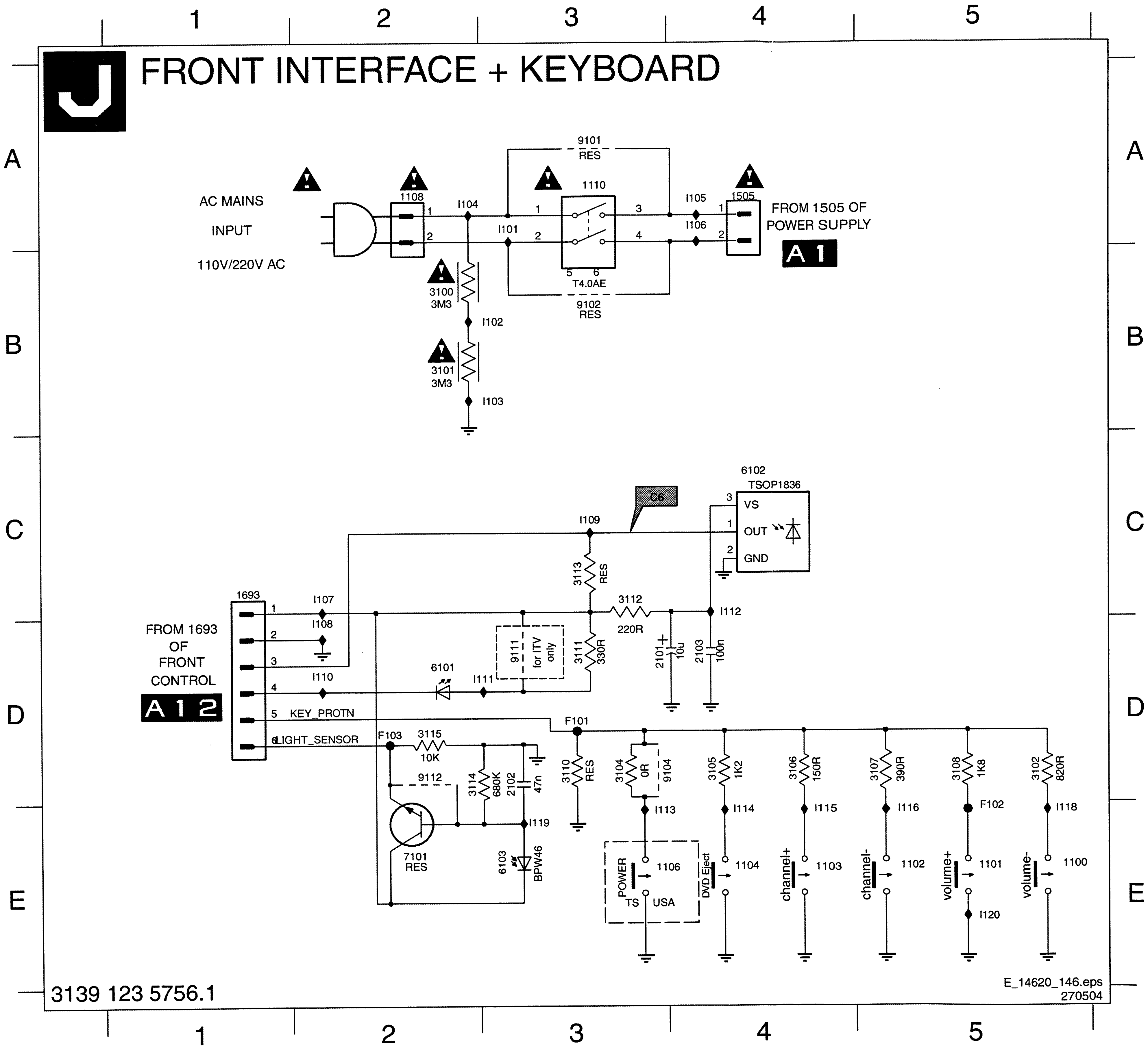
1211	D1	1606	D4	2698	A3	3691	B3	6691	B4	9001	C1	9695	B3
1231	C3	1693	A3	3500	B2	3693	B3	6692	B4	9002	D2	9696	A3
1505	A1	2691	A4	3501	B3	3694	B3	6693	A4	9685	B3		


1 2 3 4
A B C D
2698
1693
2691
1505
9695
3693
3694
3691
9685
6692
3500
3501
6691
9001
1231
1211
1606
9002
3139 123 5722.1 Wk.403
3139 123 5722.1
E_14480_035.eps 100204

Layout Front Interface Panel (PV-2) (Bottom Side)

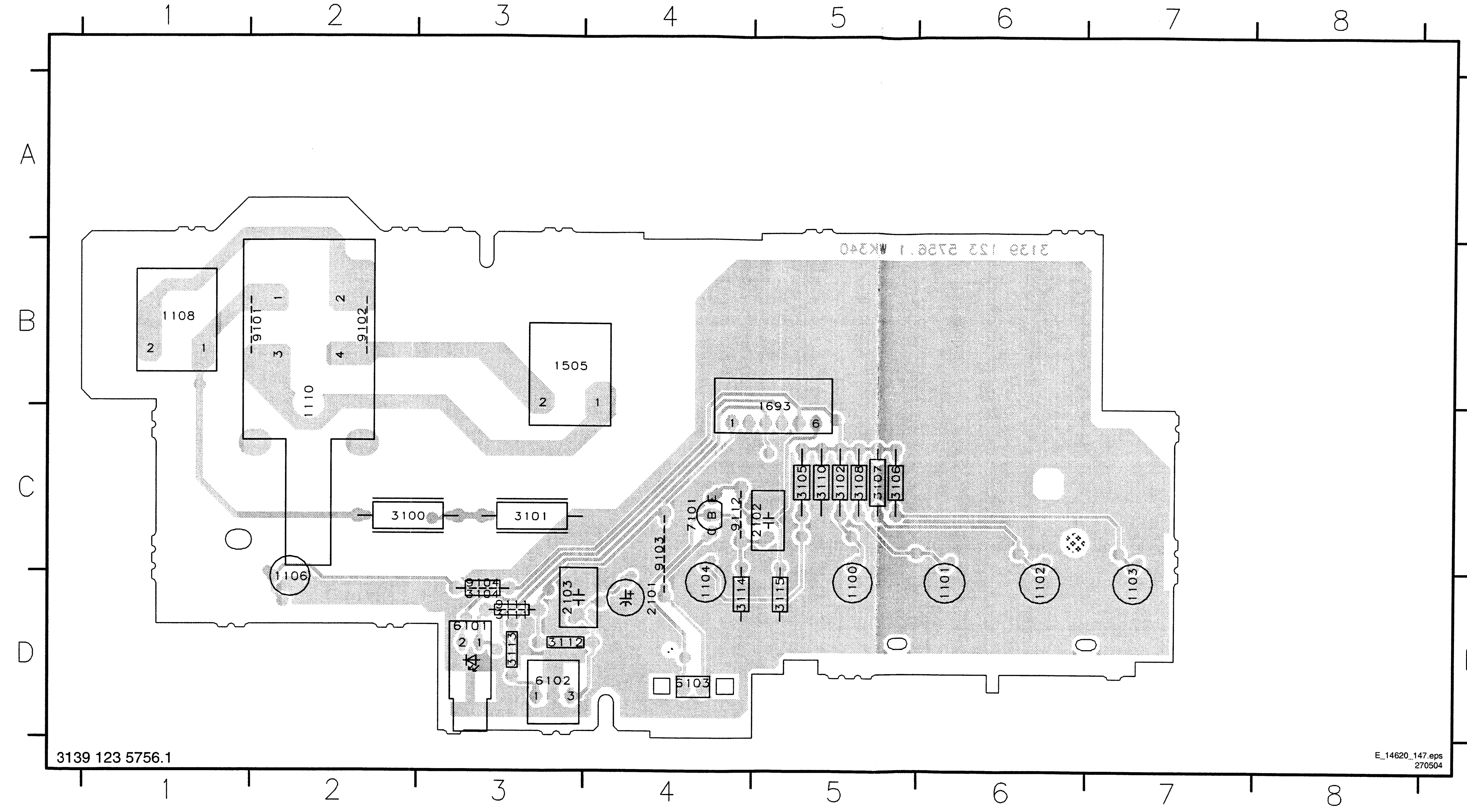

1 2 3 4
A B C D
7691
4601
3139 123 5722.1 Wk.403
3139 123 5722.1
E_14480_036.eps 100204

Front Interface and Keyboard Panel


1
2
3
4
5
A
B
C
D
E
J
FRONT INTERFACE + KEYBOARD
AC MAINS
INPUT
110V/220V AC
1108
I104
I101
9101
RES
1110
T4.0AE
9102
RES
I105
I106
1505
FROM 1505 OF
POWER SUPPLY
A1
3100
3M3
I102
3101
3M3
I103
6102
TSOP1836
VS
OUT
GND
C6
I109
3113
RES
3112
220R
I112
2101
10u
2103
100n
1693
FROM 1693
OF
FRONT
CONTROL
A12
I107
I108
I110
6101
I111
9111
for ITV
only
3111
330R
KEY_PROTN
LIGHT_SENSOR
F103
3115
10K
9112
3114
680K
2102
47n
I119
7101
RES
6103
BPW46
F101
3110
RES
3104
0R
9104
I113
3105
1K2
I114
3106
150R
I115
3107
390R
I116
3108
1K8
F102
3102
820R
I118
POWER
TS
USA
1106
DVD Eject
1104
channel+
1103
channel-
1102
volume+
1101
I120
volume-
1100
3139 123 5756.1
E_14620_146.eps
270504

1100	E5
1101	E5
1102	E5
1103	E4
1104	E4
1106	E3
1108	A2
1110	A3
1505	A4
1693	C1
2101	D3
2102	D3
2103	D4
3100	B2
3101	B2
3102	D5
3104	D3
3105	D4
3106	D4
3107	D5
3108	D5
3110	D3
3111	D3
3112	C3
3113	C3
3114	D2
3115	D2
6101	D2
6102	C4
6103	E3
7101	E2
9101	A3
9102	B3
9104	D4
9111	D3
9112	D2
F101	D3
F102	D5
F103	D2
I101	A3
I102	B3
I103	B3
I104	A2
I105	A4
I106	A4
I107	C2
I108	D2
I109	C3
I110	D2
I111	D3
I112	C4
I113	E3
I114	E4
I115	E4
I116	E5
I118	E5
I119	E3
I120	E5

Layout Front Interface and Keyboard Panel (Top Side)


1
2
3
4
5
6
7
8
A
B
C
D
1108
1110
9101
9102
1505
1693
3100
3101
1106
9104
3104
6101
3113
3112
6102
5103
2103
2101
9103
7101
9112
2102
1104
3114
3115
3105
3110
3102
3108
3107
3106
1100
1101
1102
1103
3139 123 5756.1 WK340
3139 123 5756.1
E_14620_147.eps
270504

1100	D5
1101	D6
1102	D6
1103	D7
1104	D4
1106	D2
1108	B1
1110	B2
1505	B3
1693	B5
2101	D4
2102	C5
2103	D3
3100	C2
3101	C3
3102	C5
3104	D3
3105	C5
3106	C5
3107	C5
3108	C5
3110	C5
3111	D3
3112	D3
3113	D3
3114	D4
3115	D5
6101	D3
6102	D3
6103	D4
7101	C4
9101	B2
9102	B2
9103	C4
9104	D3
9111	D3
9112	C4

8. Alignments

Index of this chapter:
1. General Alignment Conditions
2. Hardware Alignments
3. Software Alignments and Settings

Note:
- The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5 "Service Modes, ...".
- Menu navigation is done with the CURSOR UP, DOWN, LEFT, or RIGHT keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:
- AC voltage and frequency: 120 V_ac / 60 Hz or 240 V_ac / 50 Hz (region dependent).
- Connect the set to the Mains voltage via an isolation transformer with a low internal resistance.
- Allow the set to warm up for approximately 20 minutes.
- Measure the voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply). Never use the cooling fins / plates as ground.
- Test probe: Ri > 10 Mohm; Ci < 2.5 pF.
- Use an isolated trimmer / screwdriver to perform the alignments.

8.2 Hardware Alignments

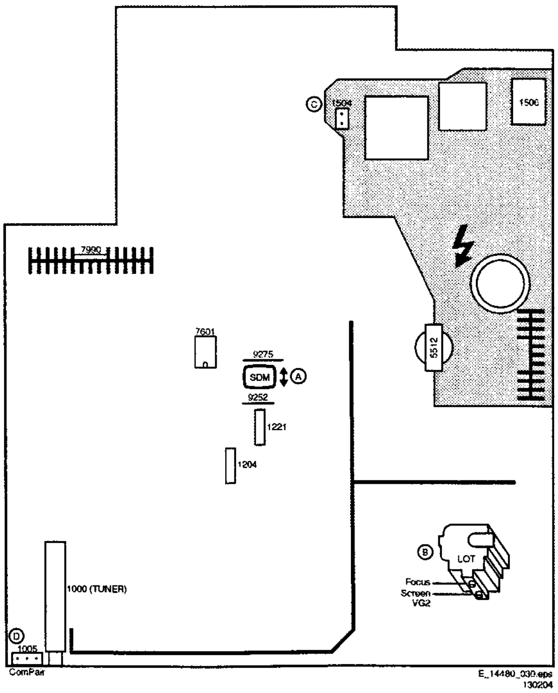


Figure 8-1 Top view family board

8.2.1 Vg2 Adjustment

1. Activate the SAM.
2. Go to the WHITE TONE sub menu.
3. Set the values of NORMAL RED, GREEN and BLUE to "32".
4. Go, via the MENU key, to the normal user menu and set
5. SATURATION/COLOR to "0".
6. CONTRAST to "0".
7. BRIGHTNESS to minimum (OSD just visible).
8. Return to the SAM via the MENU key.
9. Connect the RF output of a pattern generator to the antenna input. Test pattern is a 'black' picture (blank screen on CRT without any OSD info) with a signal strength of 1 V_pp.
10. Set the channel of the oscilloscope to 50 V/div and the time base to 0.2 ms (external triggering on the vertical pulse). Ground the scope at the CRT panel and connect a 10:1 probe to one of the cathodes of the picture tube socket (see diagram B).
11. Measure the cut off pulse during first full line after the frame blanking (see figure "V_cutoff waveform"). You will see two pulses, one being the "cut off" pulse and the other being the "white drive" pulse. Choose the one with the lowest value; this is the "cut off" pulse.
12. Select the cathode with the highest V_dc value for the alignment. Adjust the V_cutoff of this gun with the SCREEN potentiometer (see figure "Top view family board") on the LOT to 160 V_dc, except for the 25/28BLD picture tube (Black Line Display, for EU only); this tube must be aligned to 140 V_dc.
13. Restore BRIGHTNESS and CONTRAST to normal (= 31).

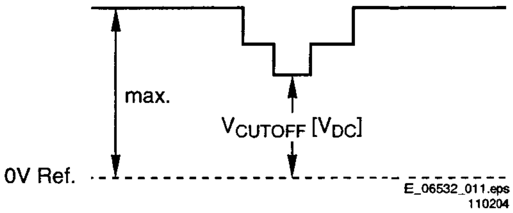
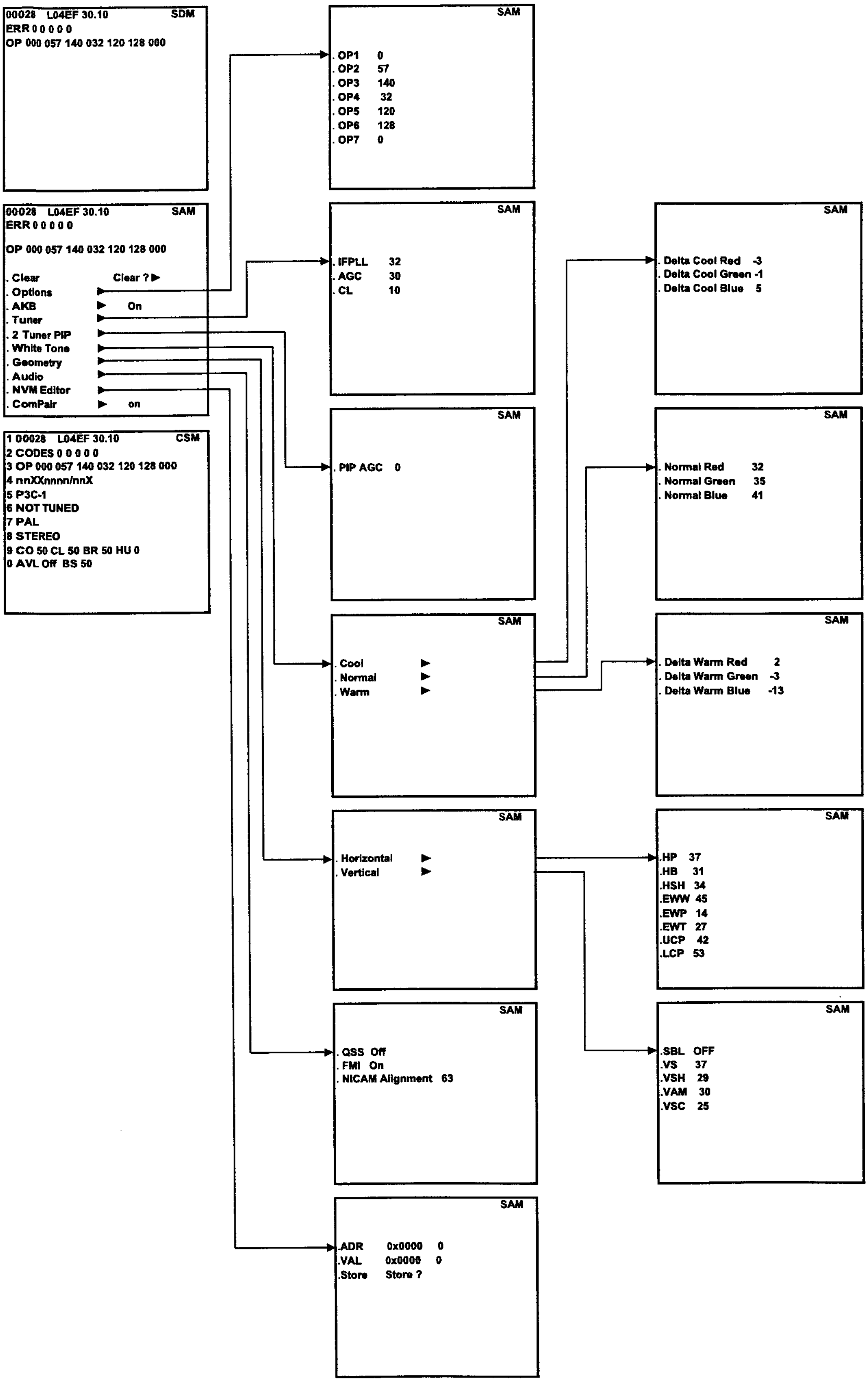


Figure 8-2 V_cutoff waveform

8.2.2 Focusing

1. Tune the set to a circle or crosshatch test pattern (use an external video pattern generator).
2. Choose picture mode NATURAL (or MOVIES) with the SMART PICTURE button on the remote control transmitter.
3. Adjust the FOCUS potentiometer (see figure "Top view family board") until the vertical lines at 2/3 from east and west, at the height of the centreline, are of minimum width without visible haze.

8.3 Software Alignments and Settings



```
00028  L04EF 30.10          SDM
ERR 0 0 0 0 0
OP 000 057 140 032 120 128 000
```

```
00028  L04EF 30.10          SAM
ERR 0 0 0 0 0

OP 000 057 140 032 120 128 000

. Clear          Clear ? ▶
. Options        ▶
. AKB            ▶   On
. Tuner          ▶
. 2 Tuner PIP    ▶
. White Tone     ▶
. Geometry       ▶
. Audio          ▶
. NVM Editor     ▶
. ComPair        ▶   on
```

```
1 00028  L04EF 30.10        CSM
2 CODES 0 0 0 0 0
3 OP 000 057 140 032 120 128 000
4 nnXXnnnn/nnX
5 P3C-1
6 NOT TUNED
7 PAL
8 STEREO
9 CO 50 CL 50 BR 50 HU 0
0 AVL Off  BS 50
```

```
                    SAM
. OP1   0
. OP2   57
. OP3   140
. OP4    32
. OP5   120
. OP6   128
. OP7   0
```

```
                    SAM
. IFPLL    32
. AGC      30
. CL       10
```

```
                    SAM
. PIP AGC   0
```

```
                    SAM
. Cool          ▶
. Normal        ▶
. Warm          ▶
```

```
                    SAM
. Horizontal    ▶
. Vertical      ▶
```

```
                    SAM
. QSS  Off
. FMI  On
. NICAM Alignment  63
```

```
                    SAM
.ADR     0x0000   0
.VAL     0x0000   0
.Store   Store ?
```

```
                    SAM
. Delta Cool Red   -3
. Delta Cool Green -1
. Delta Cool Blue   5
```

```
                    SAM
. Normal Red      32
. Normal Green    35
. Normal Blue     41
```

```
                    SAM
. Delta Warm Red      2
. Delta Warm Green   -3
. Delta Warm Blue   -13
```

```
                    SAM
.HP   37
.HB   31
.HSH  34
.EWW  45
.EWP  14
.EWT  27
.UCP  42
.LCP  53
```

```
                    SAM
.SBL  OFF
.VS   37
.VSH  29
.VAM  30
.VSC  25
```

Figure 8-3 Service Mode overview

Enter the Service Alignment Mode (see also chapter 5 "Service Modes, ..."). The SAM menu will now appear on the screen. Select one of the following alignments:

- Options
- Tuner
- White Tone
- Geometry
- Audio

8.3.1 Options

Options are used to control the presence/absence of certain features and hardware.

How to change an Option Byte

An Option Byte represents a number of different options. Changing these bytes directly, makes it possible to set all options very fast. All options are controlled via seven option bytes. Select the option byte (OP1.. OP7) with the MENU UP/ DOWN keys, and enter the new value.

Leaving the OPTION submenu saves the changes in the Option Byte settings. Some changes will only take effect after the set has been switched "off" and "on" with the AC power switch (cold start).

How to calculate the value of an Option Byte

- Calculate an Option Byte value (OP1 .. OP7) in the following way:
- Check the status of the single option bits (OB): are they enabled (1) or disabled (0).
- When an option bit is enabled (1) it represents a certain value (see column "Bit value" in table below). When an option bit is disabled, its value is 0.
- The total value of an Option Byte (decimal) is formed by the sum of its eight option bits. The factory values are printed on a sticker on the CRT.

Table 8-1 Option Byte calculation

Bit (value)	OP1	OP2	OP3	OP4	OP5	OP6	OP7
0 (1)	OB10	OB20	OB30	OB40	OB50	OB60	OB70
1 (2)	OB11	OB21	OB31	OB41	OB51	OB61	OB71
2 (4)	OB12	OB22	OB32	OB42	OB52	OB62	OB72
3 (8)	OB13	OB23	OB33	OB43	OB53	OB63	OB73
4 (16)	OB14	OB24	OB34	OB44	OB54	OB64	OB74
5 (32)	OB15	OB25	OB35	OB45	OB55	OB65	OB75
6 (64)	OB16	OB26	OB36	OB46	OB56	OB66	OB76
7 (128)	OB17	OB27	OB37	OB47	OB57	OB67	OB77
Total:	**Sum**	**Sum**	**Sum**	**Sum**	**Sum**	**Sum**	**Sum**

Option Bit Assignment

Following are the option bit assignments for all software clusters.

Table 8-2 Option code overview per model

Bit	Byte_0	Description	21PT5458/01	21PT5509/01	21PT5518/01	21PT5518/05	21PT5518/58	21PT5618/01	21PT5618/05	21PT5618/58	25PT4458/01	25PT4458/05	28PT4458/01	28PT4458/05	28PT5008/01	28PT5008/05	28PT4408/01	28PT4418/01	29PT5408/01	29PT5408/58	29PT5458/01	29PT5509/01	29PT5518/01	29PT5518/05	29PT5518/58	29PT5618/01	29PT5618/05	29PT5618/58	24PW6518/01	24PW6518/05	28PW5408/01	28PW6008/01	28PW6008/05	28PW6008/58	28PW6408/01	28PW6408/05	28PW6408/58	28PW6508/01	28PW6518/01	28PW6518/05	28PW6518/58	28PW6558/01	28PW6618/01	28PW6618/05	28PW6618/58	32PW6408/01	32PW6408/05	32PW6518/01	32PW6518/05	32PW6618/01	32PW6618/05
7	MVK		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	OSVE	Black current measuring in overscan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	TFR	DC transfer ratio of luminance signal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	FSL	Forced slicing level for vertical sync	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	HP2	Synchronization of OSD/Text display	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	HCO	EHT tracking mode	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	FMI	Connection of output of QSS amplifier	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	QSS	Mode of quasi split sound amplifier	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Decimal		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Hex		05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
Bit	Byte_1	Description																																																	
7	SVMA	Scavem On / Off	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	SAM Mode	Service Align mode on/off	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	SDM Mode	Service default mode on/off	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	White Pattern On	Last colour pattern status in factory mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Continuous Factory	Continuous factory mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Decimal		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hex		00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
Bit	Byte_2	Description																																																	
7	PSNS	For PAL colour enhancement in ES4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Factory Mode	Factory mode on	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Surf Mode	Surf mode on/off	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Child Lock Mode	Child lock enabled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Last Power Mode	Last power status of the set	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	Cable Mode	Cable/Antenna mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bit	Byte_0	Description	21PT5458/01	21PT5509/01	21PT5518/01	21PT5518/05	21PT5518/58	21PT5618/01	21PT5618/05	21PT5618/58	25PT4458/01	25PT4458/05	28PT4458/01	28PT4458/05	28PT5008/01	28PT5008/05	28PT4408/01	28PT4418/01	29PT5408/01	29PT5408/58	29PT5458/01	29PT5509/01	29PT5518/01	29PT5518/05	29PT5518/58	29PT5618/01	29PT5618/05	29PT5618/58	24PW6518/01	24PW6518/05	28PW5408/01	28PW6008/01	28PW6008/05	28PW6008/58	28PW6408/01	28PW6408/05	28PW6408/58	28PW6508/01	28PW6518/01	28PW6518/05	28PW6518/58	28PW6558/01	28PW6618/01	28PW6618/05	28PW6618/58	32PW6408/01	32PW6408/05	32PW6518/01	32PW6518/05	32PW6618/01	32PW6618/05
1	Tuner Auto Mode	Auto mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Mute Status	Mute status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Decimal		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	Hex		08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08	08
Bit	Byte_3	Description																																																	
7	CFA0	Comb filter On/Off	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0
6	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	BLS	Blue stretch mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	LNA Last Status		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Hotel KBD Lock	Keyboard locked	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Hotel Mode	TV in Hotel mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Wake Up Mode		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Radio/TV Mode	Radio mode or TV mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Decimal		128	128	128	128	128	0	0	0	128	128	128	128	128	128	128	128	128	128	128	0	0	0	0	0	0	0	0	0	128	128	128	128	128	128	128	0	0	0	0	0	0	0	0	128	128	0	0	0	0
	Hex		80	80	80	80	80	00	00	00	80	80	80	80	80	80	80	80	80	80	80	00	00	00	00	00	00	00	00	00	80	80	80	80	80	80	80	00	00	00	00	00	00	00	00	80	80	00	00	00	00
Bit	Byte_4	Description																																																	
7	PIP QSS	PIP QSS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1
6	CRA0	Coring on SVM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	BSD	Black Stretch Depth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	BKS	Black Stretch Mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	SCRSAVER Mode	Screen saver mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	DVD Tray Lock	Lock/Unlock DVD tray	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	LPG		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Signal Strength	Signal Strength Switch in MK2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Decimal		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128	128	128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128	128	128	0	0	0	0	128	128
	Hex		00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	80	80	80	00	00	00	00	00	00	00	00	00	00	00	00	00	00	80	80	80	00	00	00	00	80	80
Bit	Byte_5	Description																																																	
7	DSK	Dynamic Skin Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	DSA	Dynamic skin tone angle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	LLB	Low level of beam current limiter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	CBS	Control sequence of beam current limiting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	GAM	Gamma control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	MUS	NTSC matrix	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	NRR	No red reduction during blue stretch	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	FFI	Fast Filter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Decimal		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Hex		06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06	06
Bit	Byte_6	Description																																																	
7	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Reserved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	LTI Status	LTI last status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Decimal		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hex		00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

- Option Byte 1 (OP1)
  - OB17: PHILIPS TUNER
  - OB16: FM RADIO
  - OB15: LNA
  - OB14: ATS (EU)
  - OB13: ACI
  - OB12: UK PNP
  - OB11: VIRGIN MODE
  - OB10: CHINA
- Option Byte 2 (OP2)
  - OB27: SC
  - OB26: GREEN UI
  - OB25: CHANNEL NAMING
  - OB24: LTI
  - OB23: TILT
  - OB22: FINE TUNING
  - OB21: PIP PHILIPS TUNER
  - OB20: HUE
- Option Byte 3 (OP3)
  - OB37: EW FUNCTION
  - OB36: 2 TUNER PIP
  - OB35: PIP SPLITTER
  - OB34: SPLITTER
  - OB33: VIRTUAL DOLBY
  - OB32: WIDE SCREEN
  - OB31: WSSB (EU)
  - OB30: ECO SUBWOOFER
- Option Byte 4 (OP4)
  - OB47: Reserved (value= 0)
  - OB46: Reserved (value= 0)
  - OB45: ULTRA BASS
  - OB44: DELTA VOLUME
  - OB43: Reserved (value= 0)
  - OB42: VOLUME LIMITER
  - OB41: Reserved (value= 0)
  - OB40: STEREO NICAM 2CS
- Option Byte 5 (OP5)
  - OB57: AV1
  - OB56: AV2
  - OB55: AV3
  - OB54: CVI
  - OB53: SVHS2
  - OB52: SVHS3
  - OB51: HOTEL MODE
  - OB50: Reserved (value= 0)
- Option Byte 6 (OP6)
  - OB67: PERSONAL ZAPPING
  - OB66: Reserved (value= 0)
  - OB65: FM TRAP
  - OB64: COMB FILTER
  - OB63: ACTIVE CONTROL
  - OB62: VIDEO TEXT
  - OB61: LIGHT SENSOR
  - OB60: DUAL TEXT
- Option Byte 7 (OP7)
  - OB77: TIME WIN1
  - OB76: Reserved (value= 0)
  - OB75: Reserved (value= 0)
  - OB74: Reserved (value= 0)
  - OB73: Reserved (value= 0)
  - OB72: Reserved (value= 0)
  - OB71: Reserved (value= 0)
  - OB70: Reserved (value= 0)

Option bit definition

Option Byte 1 (OP1)

- OB17: PHILIPS TUNER
  - 0 : ALPS / MASCO compatible tuner is in use.
  - 1 : Philips compatible tuner is in use.
- OB16: FM RADIO
  - 0 : FM radio feature is disabled or not applicable.
  - 1 : FM radio feature is enabled.
- OB15: LNA
  - 0 : Auto Picture Booster is not available or not applicable.
  - 1 : Auto Picture Booster is available.
- OB14: ATS
  - 0 : Automatic Tuning System (ATS) feature is disabled or not applicable.
  - 1 : ATS feature is enabled. When ATS is enabled, it sorts the program in an ascending order starting from program “1”.
- OB13: ACI
  - 0 : Automatic Channel Installation (ACI) feature is disabled or not applicable.
  - 1 : ACI feature is enabled.
- OB12: UK PNP
  - 0 : UK's default Plug and Play setting is not available or not applicable.
  - 1 : UK's default Plug and Play setting is available.
  - When UK PNP and VIRGIN MODE are set to “1” at the initial setup and after exiting from menu, VIRGIN MODE will be set automatically to “0” while UK PNP remains “1”.
- OB11: VIRGIN MODE
  - 0 : Virgin mode is disabled or not applicable.
  - 1 : Virgin mode is enabled. Plug and Play menu item will be displayed to perform installation at the initial startup of the TV when VIRGIN MODE is set to “1”. After installation is finished, this option bit will be automatically set to “0”.
- OB10: CHINA
  - 0 : Tuning is not for China set, or this option bit is not applicable.
  - 1 : Tuning is for China set.

Option Byte 2 (OP2)

- OB27: SC
  - 0 : Soft clipping is disabled.
  - 1 : Soft clipping is enabled.
- OB26: GREEN UI
  - 0 : Green UI is disabled (for Philips brand).
  - 1 : Green UI is enabled (for Magnavox brand).
  - Note: only for NAFTA region.
- OB25: CHANNEL NAMING
  - 0 : Name FM Channel is disabled or not applicable.
  - 1 : Name FM Channel is enabled.
  - Note : Name FM channel can be enabled only when FM RADIO= “1”.
- OB24: LTI
  - 0 : Luminance Transient Improvement (LTI) is disabled or not applicable.
  - 1 : LTI is enabled.
- OB23: TILT
  - 0 : Rotate Picture is disabled or not applicable.
  - 1 : Rotate Picture is enabled.
- OB22: FINE TUNING
  - 0 : Fine Tuning for Channel Offset is disabled or not applicable.
  - 1 : Fine Tuning for Channel Offset is enabled.
- OB21: PIP PHILIPS TUNER
  - 0 : ALPS / MASCO compatible tuner is in use for PIP module.
  - 1 : Philips compatible tuner is in use for PIP module.
- OB20: HUE
  - 0 : Hue/Tint Level is disabled or not applicable.
  - 1 : Hue/Tint Level is enabled.

Option Byte 3 (OP3)

- OB37: EW FUNCTION
  - 0 : EW function is disabled. In this case, only Expand 4:3 is allowed, Compress 16:9 is not applicable.
  - 1 : EW function is enabled. In this case, both Expand 4:3 and Compress 16:9 are applicable.
- OB36: 2 TUNER PIP
  - 0 : Software selection no PIP
  - 1 : Software selection with PIP

  - Note: Only for EU/AP region for sets with PIP.
- OB35: PIP SPLITTER
  - 0 : Normal Tuner in PIP
  - 1 : Splitter in PIP
  - Note: Only for EU/AP region. For PIP sets and build in with Splitter in PIP tuner.
- OB34: SPLITTER
  - 0 : Normal Tuner for main chassis
  - 1 : Splitter Tuner for main chassis
  - Note: Only for EU/AP region.
- OB33: VIRTUAL DOLBY
  - 0 : Virtual Dolby is not applicable.
  - 1 : Virtual Dolby is applicable.
- OB32: WIDE SCREEN
  - 0 : Software is used for 4:3 sets or not applicable.
  - 1 : Software is used for 16:9 sets.
- OB31: WSSB (EU)
  - 0 : WSSB is disabled or not applicable.
  - 1 : WSSB is enabled.
  - Note : This option bit can be set to “1” only when WIDE SCREEN= “1”.
- OB30: ECO SUBWOOFER
  - 0 : Feature is disabled or not applicable.
  - 1 : Feature is enabled.

Option Byte 4 (OP4)
- OB47: Reserved
  - Default setting is “0”.
- OB46: Reserved
  - Default setting is “0”.
- OB45: ULTRA BASS
  - 0 : Ultra Bass is disabled or not applicable.
  - 1 : Ultra Bass is enabled.
  - Default setting is “0”.
- OB44: DELTA VOLUME
  - 0 : Delta Volume Level is disabled or not applicable.
  - 1 : Delta Volume Level is enabled.
- OB43: Reserved
  - Default setting is “0”.
- OB42: VOLUME LIMITER
  - 0 : Volume Limiter Level is disabled or not applicable.
  - 1 : Toggle Volume Limiter Level is enabled.
- OB41: Reserved
  - Default setting is “0”.
- OB40: STEREO NICAM 2CS
  - 0 : For AV Stereo.
  - 1 : For NICAM Stereo 2CS.

Option Byte 5 (OP5)
- OB57: AV1
  - 0 : AV1 source is not present.
  - 1 : AV1 source is present.
- OB56: AV2
  - 0 : AV2 source is not present.
  - 1 : AV2 source is present.
  - Note : For EU, when AV2=“1”, both EXT2 and SVHS2 should be included in the OSD loop.
- OB55: AV3
  - 0 : Side/Front AV3 source is not present.
  - 1 : Side/Front AV3 source is present.
- OB54: CVI
  - 0 : CVI source is not available.
  - 1 : CVI source is available.
- OB53: SVHS2
  - 0 : SVHS2 source is not available.
  - 1 : SVHS2 source is available.
  - Note : This option bit is not applicable for EU.
- OB52: SVHS3
  - 0 : SVHS3 source is not available.
  - 1 : SVHS3 source is available.
  - Note : This option bit is not applicable for EU.
- OB51: HOTEL MODE
  - 0 : Hotel mode is disabled or not applicable.
  - 1 : Hotel mode is enabled.
- OB50: Reserved
  - Default setting is “0”.

Option Byte 6 (OP6)
- OB67: PERSONAL ZAPPING
  - 0 : Personal Zapping feature is disabled or not applicable.
  - 1 : Personal Zapping feature is enabled.
- OB66: Reserved
  - Default setting is “0”.
- OB65: FM TRAP
  - 0 : FM Trap is not present.
  - 1 : FM Trap is present.
  - Note: Only for LATAM region.
- OB64: COMBFILTER
  - 0 : 3D-combfilter is not present.
  - 1 : 3D-combfilter is present.
- OB63: ACTIVE CONTROL
  - 0 : Active Control feature is disabled or not applicable.
  - 1 : Active Control feature is enabled.
- OB62: VIDEO TEXT
  - 0 : Video Text (DW with TXT) is disabled or not applicable.
  - 1 : Video Text (DW with TXT) is enabled.
  - Note: For EU only.
- OB61: LIGHT SENSOR
  - 0 : Light sensor feature is disabled or not applicable.
  - 1 : Light sensor feature is enabled.
- OB60: DUAL TEXT
  - 0 : Dual Text and Text Dual Screen are disabled or not applicable.
  - 1: Dual Text and Text Dual Screen are enabled.

Option Byte 7 (OP7)
- OB77: TIME WIN1
  - 00 : The time window is set to 1.2 s.
  - 01 : The time window is set to 2 s.
  - Note :The time-out for all digit entries depends on this setting.
- OB76: Reserved
  - Default setting is “0”.
- OB75: Reserved
  - Default setting is “0”.
- OB74: Reserved
  - Default setting is “0”.
- OB73: Reserved
  - Default setting is “0”.
- OB72 Reserved
  - Default setting is “0”.
- OB71 Reserved
  - Default setting is “0”.
- OB70: Reserved
  - Default setting is “0”.

8.3.2 Tuner

Note: Described alignments are only necessary when the NVM (item 7601) is replaced.

IF PLL

This adjustment is auto-aligned. Therefore, no action is required.

AGC (AGC take over point)

1. Set the external pattern generator to a colour bar video signal and connect the RF output to aerial input. Set amplitude to 10 mV and set frequency to 475 MHz.
2. Connect a DC multimeter to pin 1 of the tuner (item 1000 on the main panel).
3. Activate the SAM.
4. Go to the TUNER sub menu.
5. Select AGC with the UP/DOWN cursor keys.

6. Adjust the AGC-value with the LEFT/ RIGHT cursor keys until the voltage at pin 1 of the tuner lies between 3.8 and 2.3 V (default value is "20").
7. Switch the set to STANDBY, in order to store the alignments.

CL (Cathode drive level)
Always set to "5".

8.3.3 White Tone

In the WHITE TONE sub menu, the values of the black cut off level can be adjusted. Normally, no alignment is needed, and you can use the given default values.
The colour temperature mode (NORMAL, COOL and WARM) and the colour (R, G, and B) can be selected with the UP/ DOWN RIGHT/LEFT cursor keys. The value can be changed with the LEFT/RIGHT cursor keys. First, select the values for the NORMAL colour temperature. Then select the values for the COOL and WARM mode. After alignment, switch the set to STANDBY, in order to store the alignments.

Default settings:
- NORMAL:
  - NORMAL R= "26"
  - NORMAL G= "32"
  - NORMAL B= "27"
- COOL:
  - DELTA COOL R= "-3"
  - DELTA COOL G= "0"
  - DELTA COOL B= "5"
- WARM:
  - DELTA WARM R= "2"
  - DELTA WARM G= "0"
  - DELTA WARM B= "-6"

8.3.4 Geometry

The geometry alignments menu contains several items to align the set, in order to obtain correct picture geometry.

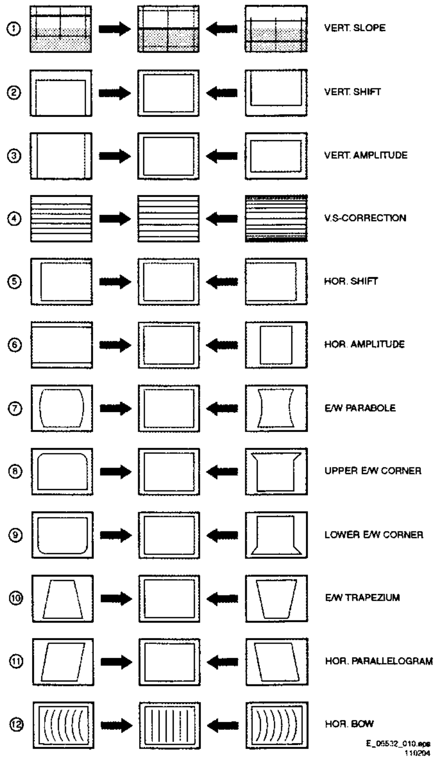


Figure 8-4 Geometry alignments

1. Connect an external video pattern generator to the aerial input of the TV-set and input a crosshatch test pattern. Set the generator amplitude to at least 1 mV and set frequency to 475 MHz.
2. Set 'Smart Picture' to NATURAL (or MOVIES).
3. Activate the SAM menu (see chapter 5 "Service Modes, ...").
4. Go to the GEOMETRY sub menu.
5. Choose HORIZONTAL or VERTICAL alignment.

Now the following alignments can be performed:

Horizontal
- **Horizontal Parallelogram (HP).** Align straight vertical lines in the top and the bottom; vertical rotation around the centre.
- **Horizontal Bow (HB).** Align straight horizontal lines in the top and the bottom; horizontal rotation around the centre.
- **Horizontal Shift (HSH).** Align the horizontal centre of the picture to the horizontal centre of the CRT.
- **East West Width (EWW).** Align the picture width until the complete test pattern is visible.
- **East West Parabola (EWP).** Align straight vertical lines at the sides of the screen.
- **Upper Corner Parabola (UCP).** Align straight vertical lines in the upper corners of the screen.
- **Lower Corner Parabola (LCP).** Align straight vertical lines in the lower corners of the screen.
- **East West Trapezium (EWT).** Align straight vertical lines in the middle of the screen.
- **H60 (Delta HSH for 60Hz, if present).** Align straight horizontal lines if NTSC system is used (60 Hz) i.s.o. PAL (50 Hz). Default value is "9".

Vertical
- **Service blanking (SBL).** Switch the blanking of the lower half of the screen "on" or "off" (to be used in combination with the vertical slope alignment).
- **Vertical Shift (VSH).** Align the vertical centring so that the test pattern is located vertically in the middle. Repeat the 'vertical amplitude' alignment if necessary.
- **Vertical slope (VS).** Align the vertical centre of the picture to the vertical centre of the CRT. This is the first of the vertical alignments to perform. For an easy alignment, set SBL to "on".
- **Vertical Amplitude (VAM).** Align the vertical amplitude so that the complete test pattern is visible.
- **Vertical S-Correction (VSC).** Align the vertical linearity, meaning that vertical intervals of a grid pattern must be equal over the entire screen height.
- **Vertical Zoom (VX, if present).** The vertical zoom is added in for the purpose of development. It helps the designer to set proper values for the movie expand or movie (16x9) compress. Default value is "25".
- **V60 (Delta VAM for 60Hz, if present).** Align straight vertical lines if NTSC system (60 Hz) is used i.s.o. PAL (50 Hz). Default value is "-2".

In the next table, you will find the GEOMETRY default values for the different sets.

Table 8-3 Default geometry values

Alignment	Default values (hex)	Default values (dec)
HP (Horizontal parallelogram)	1F	31
HB (Horizontal Bow)	1F	31
HS (Horizontal shift)	1A	26
EWW (EW width)	25	37
EWP (EW parabola width)	0A	10
EWT (EW trapezium)	1A	26
UCP (EW upper corner parabola)	1E	30
LCP (EW lower corner parabola)	28	40
VSH (Vertical Shift)	1A	26
VS (Vertical slope)	25	37
VAM (Vertical amplitude)	1E	30
VSC (Vertical S-Correction)	19	25

8.3.5 Audio

No alignments are needed for the audio sub menu. Use the given default values.

QSS (Quasi Split Sound)

- For NICAM/2CS sound system (EU/AP, except for APNTSC), set to “On”.
- For AV-Stereo sound system (sets without NICAM), set to “On”.
- For all other sets (NAFTA/LATAM/AP-NTSC), set to “Off”.

FMI (Freq. Modulation Intercarrier)

- For NICAM/2CS sound system (EU/AP, except for APNTSC), set to “On”.
- For AV-Stereo sound system (sets without NICAM), set to “Off”.
- For dBx/non-dBx sound systems, set to “On”.

NICAM Alignment

- For sets with NICAM/2CS (EU/AP, except for AP-NTSC) sound system, set to “79”.
- For all other sets (NAFTA/LATAM/AP-NTSC), set to “63” (= don’t care).

9. Circuit Descriptions, List of Abbreviations, and IC Data Sheets

Index of this chapter:

1. Introduction
2. Power Supply
3. Deflection
4. Control
5. Tuner and IF
6. Source Selection
7. Video Processing
8. Audio Processing
9. Picture in Picture (PIP)
10. Abbreviations
11. IC Data Sheets

Notes:

- Only **new** (not recently published) circuits are described in this chapter. For the other circuit descriptions, see the L01.1/M8 Service Manual.
- The descriptions below are a copy from the L04U manual, therefore sometimes a reference is made to region specific terminology or chassis (like the M8). Only the PIP description is new.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the diagrams in sections “Block Diagrams, ...”, and/or “Electrical Diagrams”. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

The "L04" chassis is a global TV chassis for the model year 2004 and is used for TV sets with large screen sizes (from 21 to 36 inch), in Super Flat and Real Flat executions (both in 4:3 and 16:9 variants).
There are three types of CRT namely the 100 degrees, 110 degrees and Wide Screen CRT.

- **The 100 deg. 4:3 CRT** is raster-correction-free and does not need East/West Correction (except when used in AP regions), therefore the corrections needed are Horizontal Shift, Vertical Slope, Vertical Amplitude, Vertical S-Correction, Vertical Shift, and Vertical Zoom for geometry corrections.
- **The 110 deg. 4:3 CRT** comes with East/West Correction. In addition to the parameter mentioned above, it also needs the Horizontal Parallelogram, Horizontal Bow, Horizontal Shift, East/West Width, East/West Parabola, East/West Upper and Lower Corners, and East/West Trapezium correction.
- **The Wide Screen TV sets** have all the correction of the 110 deg. 4:3 CRTs and also have additional picture format like the 4:3 format, 16:9, 14:9, 16:9 zoom, subtitle zoom, and the Super-Wide picture format.

In comparison to its predecessor (the L01.1/M8), this chassis is has the following (new) features:

- **Audio:** The sound processor is part of the UOC processor (called “Hercules”).
- **Video:** Enhanced video features, video drivers, and Active Control.
- **Control:** Comparable to L01.1/M8 (e.g. Dual clock, I/O mapping, I/O switching).
- **Power Supply:** Adapted to supply the Hercules IC, and to enable 0.5 W Standby power dissipation. Also provisions are made for future extensions like DVD and iDTV.

The standard architecture consists of a Main panel (called "family board"), a Picture Tube panel, a Side I/O panel, and a Top Control panel. The Main panel consists primarily of conventional components with some surface mounted devices in the audio and video processing part.

The functions for video/audio processing, microprocessor (P), and CC/Teletext (TXT) decoder are all combined in one IC (TDA1200x, item 7200), the so-called third generation Ultimate One Chip (UOC-III) or “Hercules”. This chip is mounted on the “solder” side of the main panel, and has the following features:

- Control, small signal, mono/stereo, and extensive Audio/Video switching in one IC.
- Upgrade with digital sound & video processing.
- Alignment free IF, including SECAM-L/L1 and AM.
- FM sound 4.5/5.5/6.0/6.5, no traps/bandpass filters.
- Full multi-standard color decoder.
- One Xtal reference for all functions (microprocessor, RCP, TXT/CC, RDS, color decoder, and stereo sound processor).

The tuning system features 181 channels with on-screen display. The main tuning system uses a tuner, a microcomputer, and a memory IC mounted on the main panel. The microcomputer communicates with the memory IC, the customer keyboard, remote receiver, tuner, signal processor IC and the audio output IC via the I2C bus. The memory IC retains the settings for favorite stations, customer-preferred settings, and service / factory data.
The on-screen graphics and closed caption decoding are done within the microprocessor where they are added to the main signal.

The chassis uses a Switching Mode Power Supply (SMPS) for the main voltage source. The chassis has a 'hot' ground reference on the primary side and a cold ground reference on the secondary side of the power supply and the rest of the chassis.

9.2 Power Supply

9.2.1 Block Diagram

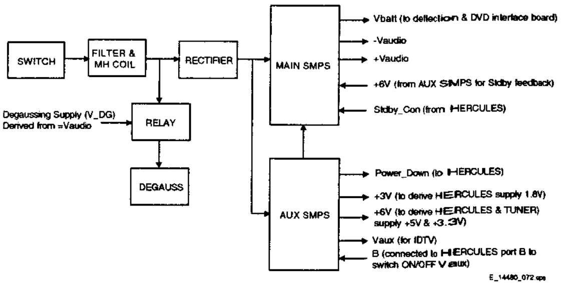

SWITCH
FILTER & MH COIL
RECTIFIER
MAIN SMPS
Degaussing Supply (V_DG) Derived from =Vaudio
RELAY
DEGAUSS
AUX SMPS
Vbatt (to deflection & DVD interface board)
-Vaudio
+Vaudio
+6V (from AUX SMPS for Stdby feedback)
Stdby_Con (from HERCULES)
Power_Down (to HERCULES)
+3V (to derive HERCULES supply 1.8V)
+6V (to derive HERCULES & TUNER) supply +5V & +3.3V)
Vaux (for IDTV)
B (connected to HERCULES port B to switch ON/OFF V aux)
E_14480_072.eps
120504

Figure 9-1 Block diagram power supply

Stdby_con signal

The Hercules generates this signal. This line is logic “low” (0 V) under normal operation and in semi-Standby of the TV, and is “high” (3.3 V) during Standby.

Power_down signal

The AUX SMPS generates this signal. It is logic “high” (3.3 V) under normal operation of the TV and goes “low” (0 V) when the AC power (or Mains) input voltage supply goes below 70 V_ac.

B (Hercules port)

This port is used to switch the AUX SMPS output V_aux “On/Off”. This is required for DVD and iDTV (for future extensions).

9.2.2 Timing Diagrams

Power ON - To Standby - Out of Standby - Power OFF

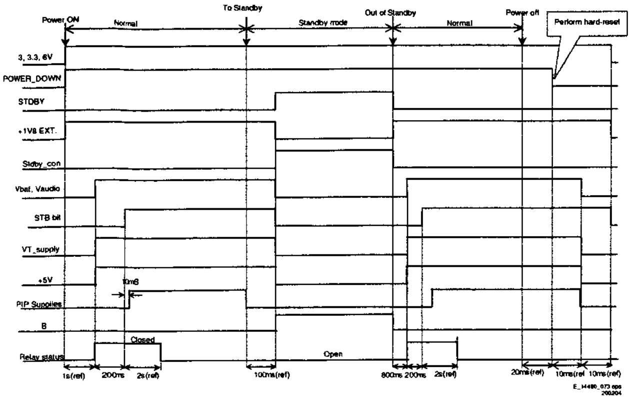

Power ON
Normal
To Standby
Standby mode
Out of Standby
Normal
Power off
Perform hard-reset
3, 3.3, 6V
POWER_DOWN
STDBY
+1V8 EXT.
Stdby_con
Vbat, Vaudio
STB bit
VT_supply
+5V
10mS
PIP Supplies
B
Closed
Open
Relay status
1s(ref)
200ms
2s(ref)
100ms(ref)
800ms
200ms
2s(ref)
20ms(ref)
10ms(ref)
10ms(ref)
E_14480_073.eps
200204

Figure 9-2 Timing diagram Standby

Power ON - To Semi Standby - Out of Semi Standby - Power OFF

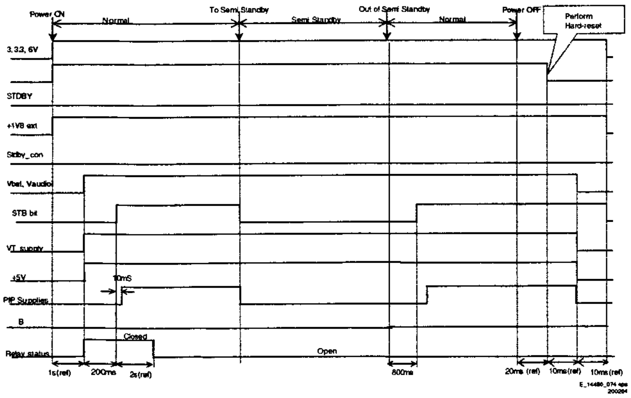

Power ON
Normal
To Semi Standby
Semi Standby
Out of Semi Standby
Normal
Power OFF
Perform Hard-reset
3,3.3, 6V
STDBY
+1V8 ext
Stdby_con
Vbat, Vaudio
STB bit
VT_supply
+5V
10mS
PIP Supplies
B
Closed
Open
Relay status
1s(ref)
200ms
2s(ref)
800ms
20ms (ref)
10ms(ref)
10ms(ref)
E_14480_074.eps
200204

Figure 9-3 Timing diagram Semi Standby

9.2.3 Startup Sequence

When the set is connected to the AC power, the rectified line voltage (via winding 4-5 of L5531 connected to pin 14 of IC7531) will start the internal voltage source to charge the V_cc capacitor (C2532). The IC starts to switch as soon as the V_cc reaches the V_cc start level of 9.5 V. This supply is automatically taken over by winding 1-2, as soon as the V_cc is high enough, and the internal supply source will stop (for high efficiency switching).

Table 9-1 Pinning overview TEA1523

Pin	Symbol	Description
2	Gnd	This pin is Ground of the IC.
3	V_cc	This pin is connected to the supply voltage. An internal current charges the V_cc capacitor (2532), and the start-up sequence is initiated when this voltage reaches a level of 9.5 V. Note: The output power is disabled when the voltage gets below 9 V (UVLO). Operating range is between 0 to 40 V.
5	RC	Frequency setting
6	REG	This pin is connected to the feedback loop. The pin contains two functions: 1) Between 1 to 1.425 V it controls the "on" time. 2) Above the threshold of 3.5 V, it is possible to initiate "burst mode" standby.
11	Demag	This pin is connected to the V_cc winding of 5531. It has three functions: 1) During Magnetisation, the input voltage is sensed to compensate OCP level for OPP. 2) During demagnetisation, the output voltage is sensed for OVP and 3) A comparator is used to prevent continuous conduction when output is overloaded.
12	Sense	This pin contains three different functions.: 1) Dectection of soft start, protection levels of 2) OCP, and 3) SWP.
14	Drain	This pin is connected to the drain of the switch or center tap of the transformer. It contains three functions: 1) M-level (mains-dependent operation-enabling level), 2) Supply for start-up current, and 3) Valley detection.

As C2532 of IC7531 is charged, it will also start to charge the V_cc capacitor (C2511) of IC7511. Via resistor R3519 and C2511, the TEA1506 starts to switch as soon as the V_cc voltage reaches the V_cc start level of is about 11 V. The V_cc voltage is automatically taken over by the main transformer L5512 (winding 2-3) when the V_cc is high enough (when this voltage is even higher than the voltage on C2511, there is no current flow from C2532 to C2511 due to diode D6512).

Table 9-2 Pinning overview TEA1506

Pin	Symbol	Description
2	Vcc	This pin is connected to the supply voltage. When this voltage is high (Vcc_start level, about 11 V), the IC will start switching. When the voltage is lower than Vcc_uvlo (about 8.7 V), the IC will stop switching.Note: This pin is not self supplied by internal source like in TEA1507
3	Gnd	This pin is Ground of the IC.
6	Ctrl	This pin is connected to the feedback loop. The pin will control the "on" time between 1 V to 1.5 V.
7	Demag	This pin is connected to the Vcc winding of 5512. It contains three functions: 1) During magnetisation, the input voltage is sensed to compensate OCP level for OPP, 2) During demagnetisation, the output voltage is sensed for OVP and 3) a comparator is used to prevent continuous conduction when the output is overloaded.
9	Sense	This pin contains three different functions: 1) dectection of soft start, protection levels of 2) OCP, and 3) SWP.
11	Driver	This pin will drive the (MOSFET) switch.
12	HVS	This is High Volt Spacer (n.a.)
14	Drain	Connected to the Drain of the external MOSFET switch, this is the input for valley sensing and initial internal supply.

9.2.4 Standby Mode

In this mode, IC7511 (TEA1506) will be totally disabled. So there is no voltage on the main transformer output. But IC7531 (TEA1523) will still work and will provide the necessary output voltages (6V -> 5V, 3.3V, 3V -> 1.8V) to the Hercules (IC7200).

Table 9-3 PSU voltage overview

Voltage	Normal operation	Stdby mode
V_batt	130 - 143 V	0 V
V_audio	+/- 15.5 V	0 V
+6V	6 V	6 V
+3V	3 V	3 V
Stdby_con	0 V	3.3 V

9.3 Deflection

9.3.1 Synchronization

Before the Hercules (IC7200) can generate horizontal drive pulses, the +3.3V supply voltages must be present. After the start up command of the microprocessor (via I2C), the Hercules outputs the horizontal pulses. These horizontal pulses begin "initially" with double line frequency and then change "gradually" to line frequency in order to limit the current in the line stage (slow-start).

The VDRA and VDRB signals are the balanced output currents (sawtooth shaped) of the frame oscillator (pins 106 and 107 of the Hercules). These output signals are balanced, so they are less sensitive to disturbances.

There is a current source inside the UOC at pin 102. This pumps energy in the capacitor connected to this pin producing a pure saw tooth. The vertical drive signals and the E/W correction signal are derived.

Pin 108 is the East-West drive (or AVL), and it is a single ended current output. The correction for "horizontal width for changed EHT" from this pin is available by setting the HCO bit to "1".

The Phase-2 Compensation available at pin 113 gives frame correction for high beam currents. The phase compensation signal is used to correct the phase of the picture from the horizontal drive signal.

Pin 63 is the SANDCASTLE output (contains all sync info) and also HORIZONTAL FLYBACK (HFB) input.
Pin 97 is the EHT tracking/over-voltage protection pin. The HCO bit can switch on the tracking on EW. If the voltage at pin 97 exceeds 3.9 V, the over-voltage protection will be activated and the horizontal drive is switched "off" via a slow stop.

9.3.2 Horizontal Deflection

There are several executions (depending on the CRT):

- **Sets with no East-West correction.** The principle of the horizontal deflection is based on the quasi-diode modulation circuit. This horizontal deflection circuit supplies the deflection current and auxiliary voltages from the LOT.
- **Sets with East-West correction.** The principle of the horizontal deflection is based on a diode modulator with east-west correction. This horizontal deflection circuit supplies the deflection current and auxiliary voltages from the LOT.
- **Sets with dynamic East-West correction.** The principle of the horizontal deflection is based on a diode modulator with dynamic east-west correction for picture tubes with inner pincushion. This horizontal deflection circuit supplies the deflection current and auxiliary voltages from the LOT.

Basic Principle

During a scan period, either the Line Transistor or diode(s) conduct to ensure a constant voltage over the deflection coil (that results in a linear current). During the flyback period, the Line Transistor stops conducting, and the flyback capacitor(s) together with the inductance of the deflection coil creates oscillation.

First Part of Scan

Pin 62 of the UOC delivers the horizontal drive signal for the Line Output stage. This signal is a square pulse of line frequency. L5402 is the flyback drive transformer. This transformer de-couples the line output stage from the UOC. It has a direct polarization. The flyback drive circuit works with the start-up supply taken from +6V of the Aux supply (and subsequently taking from VlotAux+9V). When the H-drive is high, TS7404 conducts, and transformer L5402 starts to store energy. The base of the line transistor TS7405 is low and therefore blocks. The current in the deflection coil returns from diode D6404.

Second Part of Scan

When the H-drive is low, TS7404 does not conduct, and the energy that is stored in the transformer will transfer to the secondary, making the base of the Line Transistor high. Then the Line Transistor starts to conduct. The current in the deflection coil returns from the transistor in another direction.

Flyback

At the moment the H-drive becomes high, the base of the Line Transistor becomes low. Both the Line Transistor and the Flyback Diode will block. There is an oscillation between the flyback capacitor C2412 and the deflection coil. Because of the inductance of the LOT, the Line Transistor cannot stop conducting immediately. After the Line Transistor is out of conduction, the flyback pulse is created. The flyback capacitor charges until the current in the deflection coil reduce to zero. Then it discharges through the deflection coil and the deflection current increases from the other direction. The flyback diode conducts and is back to the first part of the scan.

Linearity Correction

Because the deflection coil has a certain resistance, a picture without any linearity issues cannot be expected. L5401 is the linearity coil to compensate for this resistance. It is a coil with a pre-magnetized core. This correction is called linearity correction.

Horizontal S-Correction

Because the electronic beam needs to travel a longer distance to both sides of the screen than the center, the middle of the screen would become narrower than both sides. To prevent this, a parabolic voltage is applied across the deflection coil during scan. To create this parabolic voltage, a capacitor called S-cap (C2417/C2418) is used as a voltage source during scan. The sawtooth current of the deflection through this capacitor creates the required parabolic voltage. This correction is called S-Correction.

Mannheim-Circuit

When the EHT is heavily loaded with a bright line, the flyback time can be increased a bit in this situation. As a result, the scan delays a bit causing a DC-shift to the right in the next line, which would create a small spike on the S-cap. This spike oscillates with the inductance of the deflection coil and the primary of LOT. The result is visible in vertical lines under horizontal white line. This is called the Mannheim-effect.

To prevent this from happening, a circuit called Mannheim-circuit is added. This consists of C2415, R3404, R3417 and D6406. During the scan, C2415 is charged via R3417. During the flyback, the S-correction parabola across the S-Cap C2417/C2418 is in its most negative, and D6406 conducts. Thus, C2415 is switched in parallel to C2417/C2418 during flyback. As C2415 is much larger than C2417/C2418, the voltage across C2415 reduces the Mannheim-effect oscillation.

Class D East-West Driver

To reduce the power loss of the normal used linear East-West amplifier, a class-D East-West circuit is used. To achieve this, the East-West parabola waveform EW_DRIVE from the Hercules (frame frequency) is sampled with a saw tooth (line frequency) taken from the line aux output. Then a series of width-modulated pulses is formed via two inverted phase amplifiers, filtered by an inductor, which then directly drive the diode modulated line circuit.

East-West Correction

To achieve a good geometry, **dynamic** S-correction is needed. The design is such that the tube/yoke needs East-West correction. Besides that, an inner pincushion is present after East-West correction. The line deflection is modulated with a parabolic voltage (frame frequency). In this way it is not so much at top and bottom, and much more in the middle.

Upon entering the picture geometry menu in the SAM mode, the following corrections will be displayed.

- EWW: East West Width.
- EWP: East West Parabola.
- UCP: Upper Corner Parabola.
- LCP: Lower Corner Parabola.
- EWT: East West Trapezium.

The East-West drive circuit realizes them all. The settings can be changed by a remote control. All changed data will be stored into the NVM after the geometry alignment.

Panorama

For Wide Screen sets, the S-correction of the picture has to adapt between the different picture modes. In particular, between 16:9 Wide Screen and 4:3 picture modes. This is achieved with the (separate) Panorama circuit (see diagram "G"). A signal (I2SDI1) from the UOC controls the state of TS7463. When in the normal 16:9 Wide Screen mode, the signal is "low" and therefore TS7463 is switched "off".
When the 4:3 mode is selected, this signal from the UOC is pulled "high", switching TS7463 "on". The relay 1463 on the Panorama panel is subsequently turned "on" and, in effect, paralleling capacitor C2475/C2474 to the S-Cap C2469/C2470. This changes the overall effective S-correction. The relay is switched "on" in 4:3 and Superwide picture modes.

9.3.3 Auxiliary Voltages

The horizontal deflection provides various auxiliary voltages derived either directly or indirectly from the secondary pins of the LOT:

- +9V: This supplies the Hercules's flyback driver.
- +11V: This supplies the frame amplifier.
- -12V: This supplies the frame amplifier.
- 50V: This supplies the frame amplifier.
- Filament: This supplies the heater pins of the picture tube.
- VideoSupply (+200V from primary side of LOT): This supplies the RGB amplifier and Scavem circuit at the CRT panel.

Notes:

- The V_T voltage (to tuner) is drawn from V_batt.
- The EHT voltage is generated by the Line Output Transformer (LOT). The Focus and Vg2 voltages are created with two potentiometers integrated in the transformer.

9.3.4 Beam Current

The beam current is adjusted with R3451 and R3452. The components R3473, R3453 and C2451 determine the EHT_info characteristic. The voltage across C2412 varies when the beam current changes. This EHT_info is used to compensate the picture geometry via pin 97 of the Hercules when the picture changes rapidly, and compensate the phase 2 loop via pin 113 of the Hercules. Also from the EHT_info line, a BCL signal is derived and sent to the Hercules for controlling the picture's contrast and brightness.

When the picture content becomes brighter, it will introduce:

- Geometry distortion due to the impedance of the LOT causing the EHT to drop.
- Picture blooming due to the picture characteristics

Because of the above mentioned, we will need a circuit for Beam Current Limiter (BCL) and EHT compensation (EHT_info). These two circuits derive the signal from the picture tube current info through LOT pin 10.

BCL

- When the BCL pin voltage goes to 2.8 V, the Hercules will start to limit CONTRAST gain.
- When it reaches 1.7 V, then the BRIGHTNESS gain limit will start to react.
- When BCL pin voltage goes to 0.8 V, the RGB will be blanked.

Components TS7483, R3490, R3491, R3492, and C2483 are for fast beam current limiting (e.g. with a Black-to-White pattern).

Components R3454, D6451, D6450, C2453, R3493, and C2230 are for average beam current limiting. C2453 and R3493 also control the timing where average beam current limiting is more active or less active.

EHT_info

The "PHI2 correction" is to correct the storage time deviation of the Line Output Transistor, which is causing geometry distortion due to brightness change.
Line EHT_info is to correct the geometry distortion due to EHT deviation.
Both of them feedback through the EHTO and PH2LF pin, and correct the geometry through the East-West circuit.

Power Down

The power down connection is for EHT discharge during AC Power "Off" state. In the Hercules, if EHT_info > 3.9 V, it will trigger the X-ray protection circuit via a 2fH soft stop sequence. The Hercules bits OSO (Switch Off in Vertical Over scan) and FBC (Fixed Beam Current Switch Off) will discharge the EHT with 1mA cathode current at over-scan position.
During switch-off, the H_out frequency is doubled immediately and the duty cycle is set to 25% fixed, during 43 ms. The RGB outputs are driven "high" to get a controlled discharge of the picture tube with 1 mA during 38 ms. This will decrease the EHT to about half the nominal value (= safety requirement). When bit OSO is set, the white spot/flash during switch-off will be written in overscan and thus will not be visible on the screen. Careful application must guarantee that the vertical deflection stays operational until the end of the discharge period.

9.3.5 DAF

The Dynamic Astigmatic Focus (DAF) circuit is required by 34RF sets only. It provides vertical DAF and horizontal DAF. Both of the parabola signals are derived through integration by using chassis available signals:

- The vertical parabola is using RC integration (via R3403 and C2401) on the Frame sensing resistor saw tooth (Frame_FB).
- The horizontal parabola is obtained by 2 RC integration (R3409, R3410, C2402, C2403) on the +9V LOT output.

Both of the parabolas are added on the output stage through adder TS7402 and TS7403. The collector of TS7402 emitter-drives TS7401 and is amplified by pull up resistor R3411. D6401 and C2405 provide the rectified supply voltage.

9.3.6 X-ray Protection

The X-ray protection circuit rectifies the filament voltage and uses it to trigger TS7481 when the EHT is too high. TS7481 is biased at "off" condition by D6480, R3482, and R3483 during normal operation. When the EHT goes too high, the voltage across R3482 will tend to increase as well, while the voltage across D6481 is fixed. Up to certain level (triggering point), TS7481 will be "on" and will force the EHT_info > 3.9 V. The chassis will be shut down through a soft stop sequence.

9.3.7 Vertical Deflection

The Frame stage consists fully of discrete components. This has the advantage for better flash behavior than when an IC was used.

The Frame differential drive signal from the Hercules comes from a current source. Resistors R3460 and R3461 convert them into a voltage, and feed them into the differential amplifier TS7455 and TS7456. The output of TS7456 is input to the next amplification stage of TS7452. Finally, TS7451 and TS7453 deliver the Vertical yoke current to the coil and feedback through the sensing resistors R3471 and R3472.
D6458 and TS7454 are used to bias TS7451 and TS7453, to get rid of zero crossovers, which can cause horizontal lines at the screen center.
The negative supply is from -12V and the positive scanning supply is from +12V through D6459. The flyback supply is derived from D6455, D6456 and C2456. This circuit is a voltage doubler, which stores energy in C2456 during the Line flyback

period and delivers the energy to C2465 during the Line scanning period. Throughout the Frame period, the charging and discharging of C2456 works alternatively. However, at the first half of the Frame scanning, TS7451 is "on" and consumes all the charge from C2456. When entering 2nd half Frame period, TS7451 is "off", so C2456 will gradually charge up to the required flyback supply.

C2463, R3464 and D6457 are for boosting the base voltage of TS7451 during the flyback period and the 1st half Frame period as well. C2463 is charged by D6457 during the 2nd half scanning. R3467 and R3468 are for oscillation damping.

The V_guard protection is to protect the Frame stage if a fault condition happens. The V_guard will sense the pulse with voltage > 3.8 V and period < 900 us. Any signal out of this range will be considered as fault, and the chassis will be shut down.

9.3.8 Tilt and Rotation

The rotation control signal is a PWM output from the UOC. It is filtered by R3252, R3246, R3259 and C2259. The DC voltage after filtering at C2259 will be amplified by R3245 (Main Board) and R3390 (CRT panel).
The output stage functions similarly as in L01.1/M8 with rotation IC TDA8941P. TS7331/TS7382 and TS7332/TS7381 will function alternatively corresponding to the rotation setting.

9.3.9 CRT panel

The RGB amplifier stage is exactly the same as in L01.1/M8. However, the RGB amplifier IC has been changed to TDA6107AJF or TDA6108AJF. The "A" indication is with gain of "80" rather than "50" in L01.1/M8. The diode D6332 used in the former chassis, to solve the bright screen during start up, is not required because this IC has the error correction implemented.

Scavem

In certain versions, the Scavem feature is used to enhance the sharpness of the picture. The RGB signals are first differentiated and subsequently amplified before feeding to an auxiliary coil known as the SVM coil. The current, flowing through the SVM coil during the picture intensity transients, modulates the deflection field and thus the scan velocity.

During the first half of the intensity increase, the scan velocity is increased (thus decreasing the current density by spreading it on a wider area). During the second half of the intensity increase, the scan velocity is decreased (increasing the current density by concentrating it on a smaller area). The increasing current density transition is sharpened. A decreasing current density transition is processed in a similar way and is also sharpened.

In this chassis the SCAVEM signal is different from its predecessor because the Hercules generates the differential SCAVEM signal inside the IC.
The supply of the SCAVEM is taken from V_bat through a 1k5 / 5 W resistor. Compared with the L01.1/M8, this has the advantage of getting better performance for the pattern with tremendous SCAVEM current (like V_sweep). In this former chassis, because the supply was taken from the 200 V through a 8k2 / 5 W resistor, the supply dropped significantly during a large SCAVEM current. In this chassis, the drop due to the pattern will be less because of the lower supply voltage impedance.
In the Main Board, 1st stage amplification is taken care by 7208 with the pull up resistors (3361, 3387) located in the CRT panel.

TS7361 and TS7362 is the current buffer delivering the current to the output stage. The diode D6361 is to lightly bias these transistors, to get rid of the zero crossover of the stage.

After that, the signal is ac-coupled to TS7363 and TS7364 where the emitter resistors (R3364 and R3370) will determine the final SCAVEM current. TS7363 and TS7364 are biased by R3363, R3366, R3367 and R3368.
C2387, R3388, R3389, R3365, R3369, C2384, and C2385 are used for suppressing unwanted oscillations.
The function of TS7376 is to limit the SCAVEM current from going too high. It basically senses the voltage after R3373 and clamps the SCAVEM signal through D6367 and C2376.

9.4 Control

The Micro Controller is integrated with the Video Processor, and is called the Hercules. For dynamic data storage, such as SMART PICTURE and SMART SOUND settings, an external NVM IC is being used.
Another feature includes an optional Teletext/Closed Caption decoder with the possibility of different page storage depending on the Hercules type number.

The Micro Controller ranges in ROM from 128 kB with no TXT-decoder to 128 kB with a 10 page Teletext or with Closed Caption.

9.4.1 Block Diagram

The block diagram of the Micro Controller application is shown below.

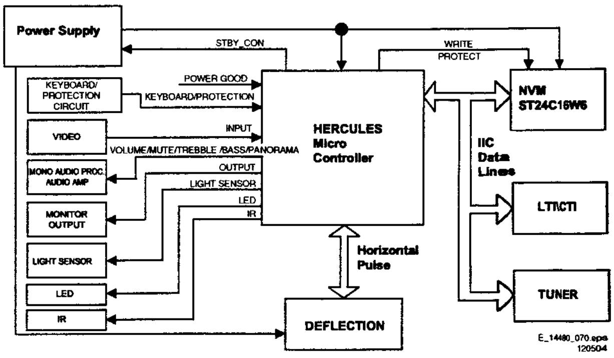


Figure 9-4 Micro Controller block diagram

9.4.2 Basic Specification

The Micro Controller operates at the following supply voltages:

- +3.3 V_dc at pins 33, 125, and 19.
- +1.8 V_dc at pins 126, 36, and 33.
- I2C pull up supply: +3.3V_dc.

9.4.3 Pin Configuration and Functionality

The ports of the Micro Controller can be configured as follows:

- A normal input port.
- An input ADC port.
- An output Open Drain port.
- An output Push-Pull port.
- An output PWM port.
- Input/Output Port

The following table shows the ports used for the L04 control:

Table 9-4 Micro Controller ports overview

Pin	Name	Description	Configuration
32	INT0/ P0.5	IR	INT0
31	P1.0/ INT1	PWRDOWN	INT1
30	P1.1/ T0	LED	P1.1
27	P0.4/ I2SWS	(for future use)	-
26	P0.3/ I2SCLK	(for future use)	-
25	P0.2/ I2SDO2	SEL_SC2_INTERFACE/ SDM	P0.2
24	P0.1/ I2SDO1	(for future use)	P0.1
23	P0.0/ I2SDI/O	Panorama	P0.0
22	P1.3/ T1	Write Protect	P1.3
21	P1.6/ SCL	SCL	SCL
20	P1.7/ SDA	SDA	SDA
18	P2.0/ TPWM	VOL_MUTE	P2.0
17	P2.1/ PWM0	ROTATION	PWM0
16	P2.2/ PWM1	SEL_LL'/M	P2.2
15	P2.3/ PWM2	STANDBY_CON	P2.3
14	P3.0/ ADC0	Light Sensor	ADC0
13	P3.1/ ADC1	(for future use)	-
10	P3.2/ ADC2	(for future use)	-
9	P3.3/ ADC3	KEYBOARD	ADC3
7	P2.4/ PWM3	A (for future use)	P2.4
6	P2.5/ PWM4	B (for future use)	P2.5
3	P1.2/ INT2	C (for future use)	INT2
2	P1.4/ RX	E (for future use)	-
1	P1.5/ TX	D (for future use)	-

The description of each functional pin is explained below:

- **LED.** This signal is used as an indication for the Standby, Remote and Error Indicator. Region diversity:
  - During protection mode, the LED blinks and the set is in standby mode.
  - During error conditions it blinks at a predefined rate.
  - After receiving a valid RC-5 or local keyboard command it flashes once.
  - For sets with error message indication, the LED blinks when message is active and the set is in standby mode.

Table 9-5 LED signal diversity

LED	Europe		AP/ LATAM		NAFTA	
0	LED brighter	Standby	LED lighted	Standby	LED lighted	Normal
1	LED dimmer	Normal	LED "off"	Normal	LED "off"	Standby

- **SCL.** This is the clock wire of the two-wire single master bi-directional I2C bus.
- **SDA.** This is the data wire of the two-wire single master bi-directional I2C bus.
- **STDBY_CON.** The Hercules generates this signal. This can enable the MAIN SMPS in normal operation and disable it during Standby. It is of logic "low" (0 V) under normal operation and "high" (3.3 V) during Standby.
- **IR.** This input pin is connected to an RC5 remote control receiver.
- **SEL-IF-LL'/ M-TRAP.** For AP: All L04 AP sets are Multi System QSS set. This is an output pin to switch the Video SAW filter between M system and other systems.
  - 0: NTSC M (default)
  - 1: PAL B/G, DK, I, L
- **Write Protect.** The global protection line is used to enable and disable write protection to the NVM. When write to the NVM is required, pin 7 of the NVM must be pulled to logic '0' first (via Write_Protect of the micro-controller pin) before a write is performed. Otherwise pin 7 of NVM must always be at logic "1"
  - 0: Disabled
  - 1: Enabled (default)
- **Mute.** This pin is use to MUTE the audio amplifier. It is configured as push pull.
- **Rotation.** This pin is configured as PWM for the Rotation feature. The output of the PWM is proportional to the feature control.
- **Light Sensor.** This pin is configured as ADC input for the Light Sensor.
- **Sel_SC2_Interface.** This pin is use to switch between the SC2_CVBS_OUT and the INTF_CVBS_OUT for the SCART_2_CVBS_OUT/ MONITOR_OUT signal.
  - 0: Hercules CVBS Output (default)
  - 1: Interface CVBS Output
- **PWRDOWN.** The AUX SMPS generates this signal. Logic "high" (3.3 V) under normal operation of the TV and goes "low" (0 V) when the Mains input voltage supply goes below 70 V_ac.
- **Keyboard.** Following are the Keyboard functions and the step values (8 bit) for it.

Table 9-6 Local keyboard values

Function	Voltage (V_dc)	Step values (8 bit)
NAFTA Standby	0	0 - 6
Ch +	0.43	7 - 33
Exit Factory (Ch- and Vol-)	0.69	34 - 53
Ch -	0.93	54 - 73
Menu (Vol - and Vol +)	1.19	74 - 96
Vol -	1.49	97 - 121
DVD Eject	1.8	122 - 147
Vol +	2.12	148 - 169

- **SDM.** This pin is configured as Open Drain during the cold start only. If this pin is shorted to ground during cold start, it will enter the SDM mode (for Service use).
- **ISP.** This pin is configured as Open Drain during the cold start only. If this pin is shorted to ground during cold start, it will enter the ISP mode (for Service use).
- **PANEL.** This pin is configured as Open Drain during the cold start only. If this pin is shorted to ground during that, then it will enter to the PANEL mode.
- **ResetEnabled.** This is an output pin to switch the control transistor (pos. TS7202) "high" or "low" for the reset of 1.8 V in case there is a corruption in the Hercules.

9.5 Tuner and IF

The tuner used in this chassis comes from two sources, from Philips and from Alps. Both tuner sources have the same pin configuration so they are 1 to 1 compatible except for the software, which will be selected by means of Option Settings.

Some features:

- Multi-Standard alignment free PLL-IF, including SECAM L/ L'.
- Integrated IF-AGC time constant.
- Integrated sound band-passes and traps (4.5 / 5.5 / 6.0 / 6.5 MHz).
- Group delay compensation (for NTSC and for PAL).
- QSS versions with digital Second-Sound-IF SSIF (AM demodulator for free).
- FM mono operation possible: Inter-Carrier or QSS.

9.5.1 Diversity

The following Tuners can be present (depending on the region and the set execution):

- Normal tuner without PIP.
- FM radio tuner without PIP.
- Normal tuner with PIP (main tuner with splitter).
- FM radio set with PIP (PIP tuner with splitter).

The SAW filter used, depends on the application concept (whether it is a QSS concept or an Intercarrier):

- OFWM3953M for QSS Video.
- OFWK9656M for QSS Audio.
- OFWM1971M for Intercarrier.

9.5.2 Pin Assignments and Functionality

Pin assignment of the Tuner:

Table 9-7 Pinning Tuner

Pin	Pin Description	DC Voltages
1	RF-AGC	4V for Maximum Gain < 4V for Strong Signal Condition
2	FM Radio Input or N.C	-
3	NC (Address Pin)	-
4	SCL	0 to 3.3 V_dc
5	SDA	0 to 3.3 V_dc
6/7	Supply Voltage	5 V_dc +/- 0.25 V
8	N.C	-
9	Tuning Supply Voltage	30 to 35 V_dc
10	FM Radio IF Output/Ground	-
11	TV IF Output	-

Pin assignment of the several SAW filters (depends on region/ execution):

Table 9-8 Pinning SAW filters

Pin	QSS Video (item 1002)	QSS Video (item 1003)	QSS Audio (item 1001)	Intercarrier (item 1002)
1	Input	Input	Input	Input
2	Input Ground	Input Ground	Switching Input	Input Ground
3	Ground	Ground	Ground	Ground
4	Output	Output	Output	Output
5	Output	Output	Output	Output
6	-	n.c.	-	-
7	-	n.c.	-	-
8	-	Ground	-	-
9	-	Free	-	-
10	-	Switching input	-	-

The table below shows the switching behavior of SAW filter.

Table 9-9 Switching behavior SAW filter

	Condition	
	High	Low
System	M	BG/DK/I/L

Note: The logic level is measured at the base of transistor 7001.

9.5.3 Option Settings

The option settings for the Tuner type can be found in Option setting 1 of the SAM mode. The Option settings for Option 1 are as follows:

- Option Byte 1
  - Bit 7: OP_PHILIPS_TUNER
  - Bit 6: OP_FM_RADIO
  - Bit 5: OP_LNA
  - Bit 4: OP_ATS
  - Bit 3: OP_ACI
  - Bit 2: OP_UK_PNP
  - Bit 1: OP_VIRGIN_MODE
  - Bit 0: OP_CHINA

For more details on the option settings, please refer to the chapter 8 “Alignments”.

9.6 Source Select

For this chassis, the audio/video source selection is controlled via the Hercules.

The Audio/Video Source Select is one of the more complex functions due to its diversity and complex switching. The Audio/ Video Source Select comprises of the following components:

- The Hercules itself for Mono Audio and Video Source Selection.
- The HEF switch for Stereo Audio as well as Video Selection.

9.6.1 Options

The option settings for the Source Selection can be found in Option settings of the SAM mode. The Option settings for Option 5 are as follows:

- Option Byte 5
  - Bit 7: AV1
  - Bit 6: AV2
  - Bit 5: AV3
  - Bit 4: CVI
  - Bit 3: SVHS2
  - Bit 2: SVHS3
  - Bit 1: HOTEL MODE
  - Bit 0:

For more detail on the option settings, please refer to the chapter 8 “Alignments”.

9.6.2 Diversity

The basic diversity of the Audio/Video Source Select is between the Mono and the Stereo sets and the number of Cinch/SCART’s as specified in the product specification. The table below shows the Audio/Video Source Select diversity for all regions:

Table 9-10 AV Source Select diversity

Pin	Symbol	Remark
51	R/Pr IN3	AV1 (CVI)
50	G/Y IN3	
49	B/Pb IN3	
52	INSSW3	
74	CVBS2/Y2	
95	AUDIO IN5 L	
94	AUDIO IN5 R	
73	AUDIO IN3 L	AV2 (SVHS)
72	AUDIO IN3 R	
71	CVBS3/Y3	
70	C2/C3	
80	AUDIO IN4 L	Side (SHVS)
79	AUDIO IN4 R	
78	CVBS4/Y4	
77	C4	
81	IFVO/SVO/CVBSI	Monitor Out
67	AUD OUT HP L	
66	AUD OUT HP R	
69	AUD OUT LS L (AUD OUT/AM OUT)	HP/ LS Out
68	AUD OUT LS R	
59	V IN (R/Pr IN2/CX)	Interface
58	U IN (B/Pb IN2)	
57	Y IN (G/Y IN2/CVBS-Yx)	
54	U OUT (INSSW2)	
76	AUDIO IN2 L	
75	AUDIO IN2 R	
86	DVBO/IFVO/FMRO	N.C.
65	CVBSO/PIP	PIP application
56	Y SYNC	100 nF
55	Y OUT	100 nF
53	V OUT (SWO)	N.C.
93	AUD OUT S L	N.C.
92	AUD OUT S R	N.C.

Table 9-11 SCART Source Select diversity

Pin	Symbol	Remark
51	R/Pr IN3	SCART 1
50	G/Y IN3	
49	B/Pb IN3	
52	INSSW3	
74	CVBS2/Y2	
86	DVBO/IFVO/FMRO	
95	AUDIO IN5 L	
94	AUDIO IN5 R	
93	AUD OUT S L	
92	AUD OUT S R	
71	CVBS3/Y3	SCART 2
70	C2/C3	
81	IFVO/SVO/CVBSI	
73	AUDIO IN3 L	
72	AUDIO IN3 R	
67	AUD OUT HP L	
66	AUD OUT HP R	
80	AUDIO IN4 L	Side I/O
79	AUDIO IN4 R	
78	CVBS4/Y4	
77	C4	
69	AUD OUT LS L (AUD OUT/AM OUT)	LS/ HP/ MON OUT
68	AUD OUT LS R	
59	V IN (R/Pr IN2/CX)	Interface
58	U IN (B/Pb IN2)	
57	Y IN (G/Y IN2/CVBS-Yx)	
54	U OUT(INSSW2)	
76	AUDIO IN2 L	
75	AUDIO IN2 R	
65	CVBSO/PIP	for PIP
56	YSYNC	100 nF
55	YOUT	100 nF
53	VOUT(SWO)	N.C.

9.6.3 Audio Source Selection

The signals coming out of the DEMDEC (internal demodulator/ decoder block of the Hercules) are selectable and consist of the following (depending on the transmission):

- DEC L/R (Can be NICAM, FM 2CS, or BTSC Stereo).
- Mono (Refers to fallback/forced Mono in Stereo Transmission).
- SAP.

For L04, the assigned I/O with respect to the Hercules is as follows:

- SCART1 or AV1 Input assigned to **Audio In 5**.
- SCART2 or AV2 Input assigned to **Audio In 3**.
- Side AV Input assigned to **Audio In 4**.
- External Interface Input assigned **to Audio In 2**.
- SCART1 Output assigned to **SCART Output**.
- SCART2 Output (EU) or Monitor Output (LA/NA/AP) assigned to **Headphone Output**.
- Constant Level Output assigned to **Loudspeaker Output**.

9.6.4 Video Source Selection

Video source selection is done inside the Hercules. Therefore it provides a video switch with 3 external CVBS inputs and a CVBS output. All CVBS inputs can be used as Y-input for Y/C signals. However, only 2 Y/C sources can be selected because the circuit has 2 chroma inputs.
All input signals are converted to YUV, and looped through an external interface. This to enable picture improvement features (like LTI/CTI) or PIP.

9.7 Video Processing

The Video Processor is basically the Hercules and the TDA9178 (CTI/LTI). Video processing is done in these two chips such as the Brightness Control, Contrast Control and so on.

Some features:

- Full YUV-loop interface (alternative functions: DVD, RGB or Y/C).
- Internal OSD insertion (not Saturation or Contrast controlled).
- Double window implementation.
- Linear / non linear scaling for 16:9 sets.
- Tint (hue) on UV signals (including DVD).
- Peaking, Coring, Black \ Blue \ White-stretch.
- Transfer-Ratio and Scavem (also on TXT).

9.7.1 Features

The features included in the Hercules are as follows:

- Brightness Control.
- Contrast Control.
- Saturation Control.
- Sharpness Control.
- Peak White Limiter.
- Beam Current Limiter.
- Black Stretch (Contrast Plus).

For sets with the TDA9178, there are two extra features:

- Luminance Transient Improvement (LTI).
- Color Transient Improvement (CTI).

9.7.2 Block Diagram

Following diagram is the block diagram of the video processing part:

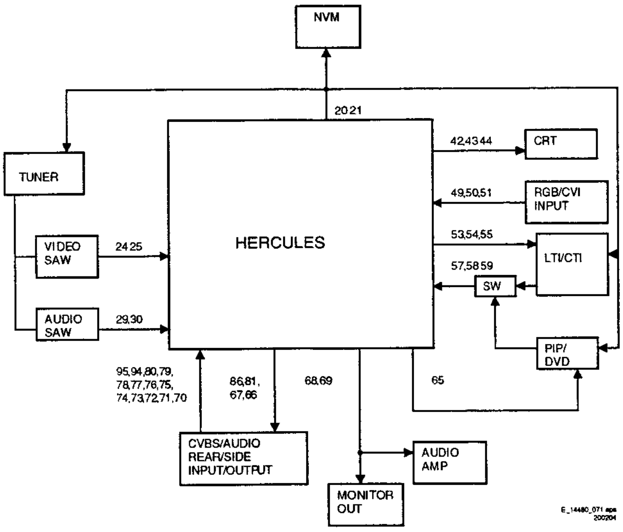


Figure 9-5 Video processing block diagram

9.7.3 LTI/CTI

The TDA9178 is an I2C-bus controlled IC (INCREDIBLE chip) with YUV interface. This IC can do mainly histogram processing, color transient improvement (CTI) and line transient improvement (LTI).

- Luminance Vector Processing involves histogram function, which provides scene dependent contrast improvement, adaptive black and white point stretching.
- Color Vector Processing involves skin tone correction, green enhancement and blue stretch.

- Spectral Processor involves step improvement processing, contour processing, smart sharpness control, color dependant sharpness and Color Transient Improvement.
- Noise detector, feature mode detector and cue flash functions.
- Demonstration mode shows all the improvement features in one picture.

Table 9-12 Pinning overview TDA9178

Pin	Symbol	Description
1	SC	Sandcastle input pin
2	n.c.	Not connected pin
3	ADEXT1	External AD-conversion #1 input pin
4	ADEXT2	External AD-conversion #2 input pin
5	ADEXT3	External AD-conversion #3 input pin
6	Y in	Luminance input pin
7	ADR	Address selection input pin
8	U in	-(B-Y) signal input pin
9	V in	-(R-Y) signal input pin
10	TP	Testpin, connected to ground
11	SCL	I2C-bus: clock input pin
12	n.c.	Not connected pin
13	n.c.	Not connected pin
14	SDA	I2C-bus: data input pin
15	DECDIG	Decoupling digital supply
16	V out	-(R-Y) signal output pin
17	U out	-(B-Y) signal output pin
18	V ee	Ground pin
19	Y out	Luminance output pin
20	V cc	Supply-voltage pin
21	S out	Luminance output for SCAVEM
22	CF	Cue-flash output pin
23	n.c.	Not connected pin
24	n.c.	Not connected pin

9.7.4 Options

The option settings allow for process of the video as per set specification. The option settings can be found in “Option 2” and “Option 6” in the SAM mode. The option settings are as follows:

- Option Byte 2
  - Bit 7:
  - Bit 6 :OP_GREEN_UI
  - Bit 5: OP_CHANNEL_NAMING,
  - Bit 4: OP_LTI,
  - Bit 3: OP_TILT,
  - Bit 2: OP_FINE_TUNING
  - Bit 1: OP_PIP_PHILIPS_TUNER,
  - Bit 0: OP_HUE,
- Option Byte 6
  - Bit 7: OP_PERSONAL_ZAPPING,
  - Bit 6:
  - Bit 5: OP_FMTRAP
  - Bit 4: OP_COMBFILTER
  - Bit 3: OP_ACTIVE_CONTROL
  - Bit 2: OP_VIDEO_TEXT
  - Bit 1 :OP_LIGHT_SENSOR,
  - Bit 0: OP_DUAL_TEXT

For more details on the option settings, please refer to the chapter 8 “Alignments”.

9.8 Audio Processing

The audio decoding is done entirely via the Hercules. The IF output from the Tuner is fed directly to either the Video-IF or the Sound-IF input depending on the type of concept chosen. There are mainly two types of decoder in the Hercules, an analog decoder that decodes only Mono, regardless of any standards, and a digital decoder (or DEMDEC) that can decode both Mono as well as Stereo, again regardless of any standards.

In this chassis, the analog decoder is used in two cases:

- It is used for AM Sound demodulation in the Europe SECAM LL’ transmission.
- It is used for all FM demodulation in AP AV-Stereo sets.

9.8.1 Diversity

The diversity for the Audio decoding can be broken up into two main concepts:

- The Quasi Split Sound concept used in Europe and some AP sets.
- The Inter Carrier concept, used in NAFTA and LATAM.

The UOC-III family makes no difference anymore between QSS- and Intercarrier IF, nearly all types are software-switchable between the two SAW-filter constructions.

Simple data settings are required for the set to determine whether it is using the Inter Carrier or the QSS concept. These settings are done via the “QSS” and “FMI” bit found in SAM mode. Due to the diversity involved, the data for the 2 bits are being placed in the NVM location and it is required to write once during startup.

On top of that, it can be further broken down into various systems depending on the region. The systems or region chosen, will in turn affect the type of sound standard that is/are allowed to be decoded.

- For the case of **Europe**, the standard consists of BG/DK/I/ LL’ for a Multi-System set. There are also versions of Eastern Europe and Western Europe set and the standard for decoding will be BG/DK and I/DK respectively. FM Radio is a feature diversity for the Europe sets. The same version can have either FM Radio or not, independent of the system (e.g. sets with BG/DK/I/LL’ can have or not have FM radio).
- For the case of **NAFTA** and **LATAM**, there is only one transmission standard, which is the M standard. The diversity then will be based on whether it has a dBx noise reduction or a Non-dBx (no dBx noise reduction).
- For the case of **AP**, the standard consists of BG/DK/I/M for a Multi-System set. The diversity here will then depends on the region. AP China can have a Multi-System and I/DK version. For India, it might only be BG standard.

9.8.2 Functionality

The features available in the Hercules are as follows:

- Treble and Bass Control.
- Surround Sound Effect that includes:
  - Incredible Stereo.
  - Incredible Mono.
  - 3D Sound (not for AV Stereo).
  - TruSurround (not for AV Stereo).
  - Virtual Dolby Surround, VDS422 (not for AV Stereo).
  - Virtual Dolby Surround, VDS423 (not for AV Stereo).
  - Dolby Pro-Logic (not for AV Stereo).
- Bass Feature that includes:
  - Dynamic Ultra-Bass.
  - Dynamic Bass Enhancement.
  - BBE (not for AV Stereo).
- Auto-Volume Leveler.
- 5 Band Equalizer.
- Loudness Control.

All the features stated are available for the Full Stereo versions and limited features for the AV Stereo

9.8.3 Audio Amplifier

The audio amplifier part is very straightforward.It uses the integrated power amplifier TDA2616Q, and delivers a maximum output of 2 x 10 W_rms.
The maximum operating condition for this amplifier is 21 V unloaded. Normal operating supply is from 7.5 V to 16 V.

Muting is done via the VOLUME_MUTE line connected to pin 2 of the amplifier-IC and coming from the UOC.

The following table shows pin functionality of the Audio Amplifier:

Table 9-13 Pinning overview TDA2616

Pin	Pin Name	Normal Operation
1	Input Left	Input AC signal
2	Mute	16 V_dc
3	Ground	0 V
4	Output L Channel	AC waveform
5	Supply Voltage (negative)	-16 V_dc
6	Output R Channel	AC waveform
7	Supply Voltage (positive)	+ 16 V_dc
8	Inverting inputs L and R	0 V
9	Input Right	Input AC signal

9.9 Picture in Picture (PIP)

The PIP application has two tuners, one with a splitter on the main chassis and another with "phono" input on the PIP panel. The same signal is injected to both tuners, so that it does not need separate auto tuning for the PIP tuner.

The TDA9887TS (item 7201) is an alignment free multi-standard vision and sound IF signal PLL demodulator for positive and negative modulation, including sound AM and FM processing.

The SDA9489 (item 7242) is a multi system color decoder with many features such as: half screen size PIP, selectable YUV or YPbPr, 16:9 application, WSS detection, Closed Caption, and OSD display for PIP window etc.

The PIP power supply is based on the step down converter principle. The +9V input voltage is converted to +5V and +3.3V via the regulator (item 7501).

9.10 Abbreviation list

2CS	2 Carrier (or Channel) Stereo
ACI	Automatic Channel Installation: algorithm that installs TV sets directly from cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AFT	Automatic Fine Tuning
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific region
AR	Aspect Ratio: 4 by 3 or 16 by 9
ATS	Automatic Tuning System
AV	External Audio Video
AVL	Automatic Volume Leveler
BCL	Beam Current Limitation
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
CC	Closed Caption
CCC	Continuous Cathode Calibration
ComPair	Computer aided rePair
CRT	Cathode Ray Tube or picture tube
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
CVI	Component Video Input
DAC	Digital to Analogue Converter
DBX	Dynamic Bass Expander or noise reduction system in BTSC
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFU	Direction For Use: description for the end user
DNR	Dynamic Noise Reduction
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for dealers to enter e.g. service mode
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EHT	Extra High Tension
EHT-INFO	Extra High Tension information
EPG	Electronic Programming Guide
EU	Europe
EW	East West, related to horizontal deflection of the set
EXT	External (source), entering the set via SCART or Cinch
FBL	Fast Blanking: DC signal accompanying RGB signals
FILAMENT	Filament of CRT
FM	Field Memory or Frequency Modulation
H	Horizontal sync signal
HP	Headphone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus
IF	Intermediate Frequency

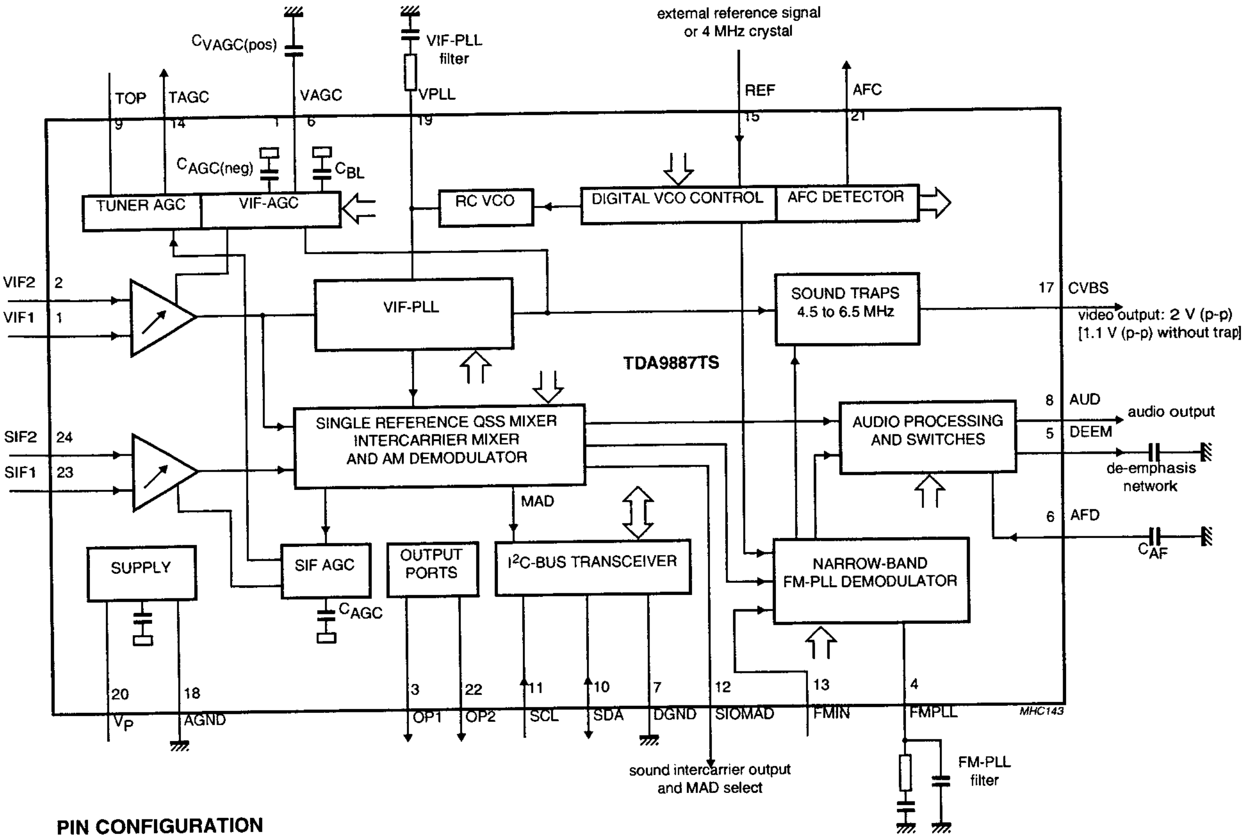
IIC	Integrated IC bus
ITV	Institutional TV
LATAM	Latin American countries like Brazil, Argentina, etc.
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LS	Large Screen or Loudspeaker
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
OB	Option Bit
OC	Open Circuit
OP	Option Byte
OSD	On Screen Display
PAL	Phase Alternating Line. Color system mainly used in West Europe (color carrier = 4.433619 MHz) and South America (color carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit board
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POR	Power-On Reset
PTP	Picture Tube Panel (or CRT-panel)
RAM	Random Access Memory
RC	Remote Control handset
RGB	Red, Green, and Blue video signals
ROM	Read Only Memory
SDAM	Service Default / Alignment Mode
SAP	Second Audio Program
SC	Sandcastle: pulse derived from sync signals
S/C	Short Circuit
SCL	Serial Clock
SDA	Serial Data
SECAM	SEequence Couleur Avec Memoire. Color system mainly used in France and East Europe. Color carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SS	Small Screen
STBY	Standby
SVHS	Super Video Home System
SW	Software
THD	Total Harmonic Distortion
TXT	Teletext
uP	Microprocessor
UOC	Ultimate One Chip
V	Vertical sync signal
V_BAT	Main supply voltage for the deflection stage (mostly 141 V)
V-chip	Violence Chip
VCR	Video Cassette Recorder
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
YC	Luminance (Y) and Chrominance (C) signal

9.11 IC Data Sheets

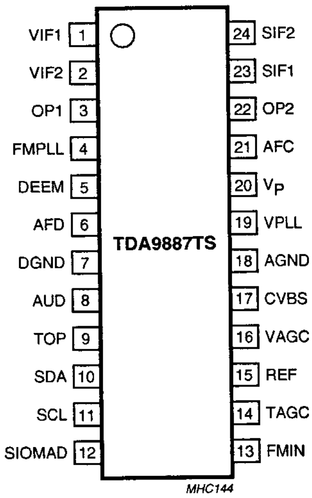
This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.11.1 Diagram F, TDA9887 (IC7201)

BLOCK DIAGRAM


CVAGC(pos)
VIF-PLL filter
external reference signal or 4 MHz crystal
TOP 9
TAGC 14
VAGC 16
VPLL 19
REF 15
AFC 21
CAGC(neg)
CBL
TUNER AGC
VIF-AGC
RC VCO
DIGITAL VCO CONTROL
AFC DETECTOR
VIF2 2
VIF1 1
VIF-PLL
SOUND TRAPS 4.5 to 6.5 MHz
17 CVBS
video output: 2 V (p-p) [1.1 V (p-p) without trap]
TDA9887TS
SIF2 24
SIF1 23
SINGLE REFERENCE QSS MIXER INTERCARRIER MIXER AND AM DEMODULATOR
AUDIO PROCESSING AND SWITCHES
8 AUD
audio output
5 DEEM
de-emphasis network
6 AFD
CAF
MAD
SUPPLY
SIF AGC
CAGC
OUTPUT PORTS
I2C-BUS TRANSCEIVER
NARROW-BAND FM-PLL DEMODULATOR
20 VP
18 AGND
3 OP1
22 OP2
11 SCL
10 SDA
7 DGND
12 SIOMAD
13 FMIN
4 FMPLL
MHC143
sound intercarrier output and MAD select
FM-PLL filter

PIN CONFIGURATION

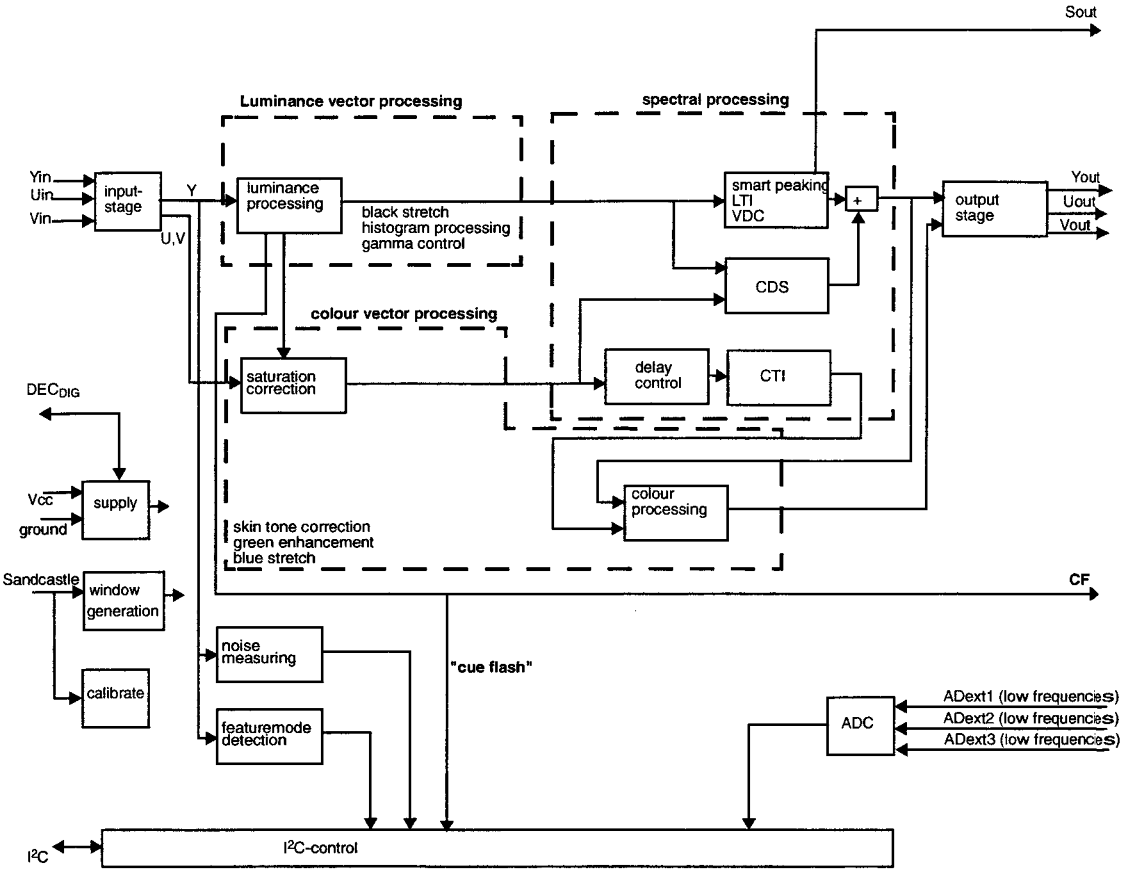

VIF1 1
VIF2 2
OP1 3
FMPLL 4
DEEM 5
AFD 6
DGND 7
AUD 8
TOP 9
SDA 10
SCL 11
SIOMAD 12
24 SIF2
23 SIF1
22 OP2
21 AFC
20 VP
19 VPLL
18 AGND
17 CVBS
16 VAGC
15 REF
14 TAGC
13 FMIN
TDA9887TS
MHC144

E_14480_129.eps
120504

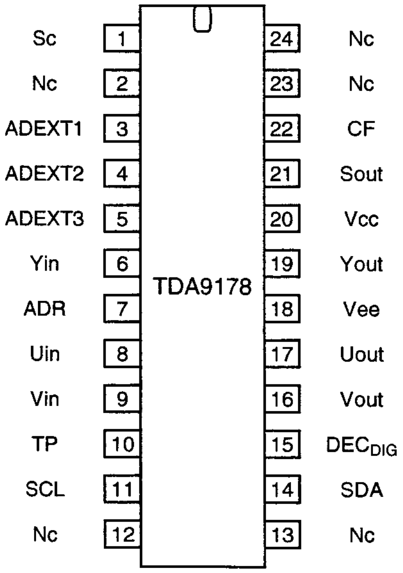
Figure 9-6 Internal Block Diagram and Pin Configuration

9.11.2 Diagram H, TDA9178 (IC7610)

BLOCK DIAGRAM


Sout
Luminance vector processing
spectral processing
Yin
Uin
Vin
input-stage
Y
U,V
luminance processing
black stretch
histogram processing
gamma control
smart peaking
LTI
VDC
+
output stage
Yout
Uout
Vout
CDS
colour vector processing
saturation correction
delay control
CTI
DECDIG
Vcc
ground
supply
colour processing
skin tone correction
green enhancement
blue stretch
Sandcastle
window generation
CF
calibrate
noise measuring
"cue flash"
featuremode detection
ADC
ADext1 (low frequencies)
ADext2 (low frequencies)
ADext3 (low frequencies)
I2C
I2C-control

PIN CONFIGURATION


Sc 1
Nc 2
ADEXT1 3
ADEXT2 4
ADEXT3 5
Yin 6
ADR 7
Uin 8
Vin 9
TP 10
SCL 11
Nc 12
24 Nc
23 Nc
22 CF
21 Sout
20 Vcc
19 Yout
18 Vee
17 Uout
16 Vout
15 DECDIG
14 SDA
13 Nc
TDA9178

E_14480_075.eps
270204

Figure 9-7 Internal Block Diagram and Pin Configuration

10. Spare Parts List

Set Level

Various

0041	3139 124 32221	Lens
0291	3111 254 23481	Coil
8278	3104 311 03391	Cable 4P 1000mm
8278▲	3104 311 03841	Cable 4P

∿

5203▲	2422 549 45514	S100245 CU B

Mono Carrier [A]

Various

0041	3139 124 41421	Lens
1001	2422 549 44341	38.9 MHz
1002	4822 242 81436	Filter OFWK3953M
1005	4822 267 10748	Connector 3p
1204	4822 265 41113	7P
1205	2422 543 01421	Crystal 24.576Mhz
1206	2422 025 11244	Connector 7p m
1207	2422 025 11244	Connector 7p m
1212	2422 025 16052	12P Female
1280	4822 267 10734	Connector 5p
1401	4822 265 30735	Connector 5p
1404▲	4822 267 10966	Connector 2p
1451▲	2422 025 10646	Connector 2p m
1452▲	4822 071 51252	Fuse 1.25A
1454▲	4822 071 51252	Fuse 1.25A
1500▲	2422 086 10914	Fuse 4A 250V
1501	2422 090 01101	Soc Fuse 1P Female
1502	2422 090 01101	Soc Fuse 1P Female
1503▲	2422 132 07467	Relay 1p 12V 5A LKS1AF
1504	4822 267 10774	Connector 2p male (red)
1505	4822 265 20723	Connector 2p
1506▲	2422 128 03111	Switch
1600	4822 276 13775	Switch
1601	4822 276 13775	Switch
1602	4822 276 13775	Switch
1603	4822 276 13775	Switch
1682	2422 025 16382	Connector 3p m
1684	3139 131 04162	Cable 3P 100mm
1693	2422 025 12482	Connector 6p m
1729	4822 267 10735	Connector 3p
1734	2422 026 05466	Soc cinch 2P
1763	3139 131 03952	CABLE SIN 280mm
8204	3139 131 03591	Cable 7p 560mm
8401	3139 121 09041	Cable 5p 560mm

⊣⊢

2001	4822 122 33761	22pF 5% 50V
2002	4822 122 33761	22pF 5% 50V
2003	5322 126 11583	10nF 10% 50V 0603
2004	3198 024 44730	47nF 50V 0603
2005	4822 124 40769	4.7µF 20% 100V
2006	4822 124 80791	470µF 20% 16V
2007	2238 586 59812	100nF 20% 50V 0603
2008	2038 035 21307	68µ 25V
2008	4822 124 40433	47µF 20% 25V
2009	2238 586 59812	100nF 20% 50V 0603
2013	4822 122 33741	10pF 10% 50V
2014	3198 016 31020	1nF 25V 0603
2016	3198 016 31020	1nF 25V 0603
2203	4822 124 41584	100µF 20% 10V
2204	2238 916 15641	22nF 10% 25V 0603
2205	4822 126 13879	220nF +80-20% 16V
2206	4822 126 13879	220nF +80-20% 16V
2207	4822 126 13879	220nF +80-20% 16V
2208	4822 126 13879	220nF +80-20% 16V
2209	4822 126 13879	220nF +80-20% 16V
2210	4822 126 13879	220nF +80-20% 16V
2211	4822 126 13879	220nF +80-20% 16V
2212	4822 126 13879	220nF +80-20% 16V
2213	4822 126 13879	220nF +80-20% 16V
2214	2238 586 59812	100nF 20% 50V 0603
2215	4822 126 13879	220nF +80-20% 16V
2216	4822 126 13879	220nF +80-20% 16V
2217	4822 124 40207	100µF 20% 25V
2218	4822 124 40433	47µF 20% 25V
2222	2238 586 15633	5.6nF 50V
2223	2238 586 59812	100nF 20% 50V 0603
2224	4822 124 40207	100µF 20% 25V
2225	4822 126 13879	220nF +80-20% 16V
2226	4822 126 13879	220nF +80-20% 16V
2229	4822 126 13879	220nF +80-20% 16V
2230	4822 124 40769	4.7µF 20% 100V
2231	2238 586 59812	100nF 20% 50V 0603
2232	2238 586 59812	100nF 20% 50V 0603
2233	2238 586 59812	100nF 20% 50V 0603
2234	4822 124 40207	100µF 20% 25V
2235	5322 126 11582	6.8nF 10% 63V
2236	5322 126 11583	10nF 10% 50V 0603
2237	2238 586 59812	100nF 20% 50V 0603
2238	4822 126 13879	220nF +80-20% 16V
2239	4822 126 13879	220nF +80-20% 16V
2240	4822 124 41631	1.5µF 50V
2241	2238 916 15641	22nF 10% 25V 0603
2242	2238 586 59812	100nF 20% 50V 0603
2243	2238 586 59812	100nF 20% 50V 0603
2244	4822 126 14491	2.2µF 10V 0805
2245	3198 016 31020	1nF 25V 0603
2246	2238 586 59812	100nF 20% 50V 0603
2247	2238 586 59812	100nF 20% 50V 0603
2248	3198 016 31020	1nF 25V 0603
2249	2238 586 59812	100nF 20% 50V 0603
2250	4822 124 40207	100µF 20% 25V
2251	2022 318 00212	150nF 50V
2252	5322 126 11583	10nF 10% 50V 0603
2253	5322 126 11583	10nF 10% 50V 0603
2254	5322 126 11578	1nF 10% 50V 0603
2255	5322 126 11583	10nF 10% 50V 0603
2256	2238 586 59812	100nF 20% 50V 0603
2257	5322 126 11579	3.3nF 10% 63V
2260	2238 586 59812	100nF 20% 50V 0603
2261	2238 586 59812	100nF 20% 50V 0603
2262	5322 126 11583	10nF 10% 50V 0603
2263	2238 586 59812	100nF 20% 50V 0603
2264	4822 126 14249	560pF 10% 50V 0603
2265	4822 124 40207	100µF 20% 25V
2266	4822 126 14491	2.2µF 10V 0805
2267	4822 126 14491	2.2µF 10V 0805
2268	4822 122 33741	10pF 10% 50V
2269	4822 122 33741	10pF 10% 50V
2270	5322 126 11578	1nF 10% 50V 0603
2271	5322 126 11578	1nF 10% 50V 0603
2272	2238 586 59812	100nF 20% 50V 0603
2273	4822 124 40207	100µF 20% 25V
2274	2238 586 59812	100nF 20% 50V 0603
2275	4822 124 40248	10µF 20% 63V
2276	4822 126 14585	100nF 10% 0805 50V
2279	2020 552 94427	100pF 5% 50V
2280	3198 017 41050	1µF 10V 0603
2282	5322 126 11578	1nF 10% 50V 0603
2288	5322 126 11578	1nF 10% 50V 0603
2289	5322 126 11578	1nF 10% 50V 0603
2290	3198 017 41050	1µF 10V 0603
2404	4822 124 11936	47µF 20% 160V
2406▲	4822 126 13185	680pF 10% 500V
2408	2020 552 94427	100pF 5% 50V
2409	2238 586 59812	100nF 20% 50V 0603
2410	4822 126 14585	100nF 10% 0805 50V
2411▲	4822 126 12263	220pF 10% 2kV
2412▲	4822 121 70637	8.2nF 5% 1600V
2413▲	4822 121 70365	39nF 10% 400V
2414	3198 017 41050	1µF 10V 0603
2415	2022 031 00172	2.2µF 160V
2418▲	2222 479 90016	270nF 5% 250V
2419	2222 468 90324	2.2µF 100V
2420	3198 017 41050	1µF 10V 0603
2425	3198 017 33330	33nF 20% 16V 0603
2427	4822 121 51305	15nF 10% 50V
2428	3198 017 33330	33nF 20% 16V 0603
2451	2222 365 85154	150nF 10% 100V
2453	4822 126 14043	1µF +80-20% 16V 0805
2454	4822 124 80791	470µF 20% 16V
2456	4822 122 32542	47nF 10% 63V
2457	2022 031 00137	4.7µF 20% 250V
2459▲	4822 122 31177	470pF 10% 500V
2460	2022 031 00139	470µF 20% 16V
2461	3198 016 31020	1nF 25V 0603
2462	3198 016 31020	1nF 25V 0603
2463	2020 021 91677	100µF 20% 50V
2464	4822 126 13881	470pF 5% 50V
2465	5322 124 40641	10µF 20% 100V
2467	4822 121 70162	10nF 5% 400V
2468	4822 126 13883	220pF 5% 50V
2469	4822 126 13879	220nF +80-20% 16V
2470	2222 601 55649	100nF 10% 100V 1206
2486	2252 508 08255	27pF 500V
2487	5322 126 10465	3.9nF 10% 50V
2488	2020 557 00002	33pF 200V
2489	5322 126 11583	10nF 10% 50V 0603
2490	4822 122 32542	47nF 10% 63V
2493	4822 124 81151	22µF 50V
2500▲	2022 330 00053	470nF 275V
2503▲	4822 126 14153	2.2nF 10% 1kV
2504▲	4822 126 14153	2.2nF 10% 1kV
2505	2020 024 90771	220µF 20% 400V
2508▲	2022 330 00049	100nF 275V
2509▲	2252 811 95022	1.5nF 20% 250V
2511	4822 124 81151	22µF 50V
2512	2238 586 59812	100nF 20% 50V 0603
2513	4822 126 13881	470pF 5% 50V
2514▲	4822 126 13862	1.5nF 10% 2kV
2515	4822 126 13881	470pF 5% 50V
2516	2238 586 59812	100nF 20% 50V 0603
2517	5322 126 11578	1nF 10% 50V 0603
2528	4822 121 51252	470nF 5% 63V
2530	2020 557 00005	330pF 100V
2531	4822 126 13881	470pF 5% 50V
2532	2020 552 96823	10µF 16V
2533	4822 126 13193	4.7nF 10% 63V
2534	2020 558 90261	68pF 1kV
2535	4822 124 40184	1000µF 20% 10V
2536	2020 012 93728	2200µF 20% 10V
2538	4822 126 13881	470pF 5% 50V
2539▲	4822 122 31177	470pF 10% 500V
2541	4822 124 40433	47µF 20% 25V
2542▲	2252 811 95021	1nF 10% 250V
2543▲	4822 126 10206	2.2nF 10% 500V
2549	2020 552 94427	100pF 5% 50V
2550	2020 557 00002	33pF 200V
2551▲	4822 126 13449	1nF 10% 2kV
2552	2022 031 00165	100µF 160V
2553	4822 126 14508	180pF 5% 50V 0603
2561▲	4822 122 31175	1nF 10% 500V
2562	4822 124 12417	2200µF 20% 25V
2562	4822 124 80061	1000µF 20% 25V
2563	4822 124 12417	2200µF 20% 25V
2563	4822 124 80061	1000µF 20% 25V
2564	4822 126 14585	100nF 10% 0805 50V
2565▲	4822 122 31175	1nF 10% 500V
2570▲	2252 811 95017	470pF 10% 250V
2571	3198 017 31530	15nF 20% 50V 0603
2572	5322 126 11583	10nF 10% 50V 0603
2573	2020 552 96683	220nF 10% 50V
2601	3198 016 31020	1nF 25V 0603
2611	4822 124 40433	47µF 20% 25V
2617	2238 586 59812	100nF 20% 50V 0603
2620	2238 586 59812	100nF 20% 50V 0603
2621	4822 124 40207	100µF 20% 25V
2622	2222 867 15339	33pF 5% 50V 0603
2623	2238 586 59812	100nF 20% 50V 0603
2624	4822 124 40207	100µF 20% 25V
2625	2022 552 05615	2.2µF 10% 6.3V 0805
2630	4822 051 30008	Jumper 0603
2631	4822 124 41796	22µF 20% 16V
2691	4822 124 40196	220µF 20% 16V
2702	4822 126 14241	330pF 0603 50V
2703	4822 124 40248	10µF 20% 63V
2705	4822 126 14241	330pF 0603 50V
2706	4822 126 14491	2.2µF 10V 0805
2708	4822 126 14241	330pF 0603 50V
2709	4822 124 40248	10µF 20% 63V
2711	4822 126 14241	330pF 0603 50V
2712	4822 126 14491	2.2µF 10V 0805
2732	4822 126 14241	330pF 0603 50V
2733	4822 124 40248	10µF 20% 63V
2735	4822 126 14241	330pF 0603 50V
2736	3198 017 41050	1µF 10V 0603
2738	4822 126 14241	330pF 0603 50V
2739	4822 124 40248	10µF 20% 63V
2741	4822 126 14241	330pF 0603 50V
2742	3198 017 41050	1µF 10V 0603
2751	4822 126 14241	330pF 0603 50V
2752	4822 124 40248	10µF 20% 63V
2753	4822 126 14241	330pF 0603 50V
2754	4822 124 40248	10µF 20% 63V
2755	5322 126 11579	3.3nF 10% 63V
2756	5322 126 11579	3.3nF 10% 63V
2759	2222 867 15339	33pF 5% 50V 0603
2760	2238 586 59812	100nF 20% 50V 0603
2917	3198 032 27190	100µF 6.3V
2985	4822 126 14508	180pF 5% 50V 0603
2986	2238 586 59812	100nF 20% 50V 0603
2987	2238 586 59812	100nF 20% 50V 0603
2988	2238 586 59812	100nF 20% 50V 0603
2989	3198 017 41050	1µF 10V 0603
2990	4822 126 14241	330pF 0603 50V
2991	4822 126 14508	180pF 5% 50V 0603

2992	3198 017 41050	1µF 10V 0603
2993	4822 126 14241	330pF 0603 50V
2994	2238 916 15641	22nF 10% 25V 0603
2995	2238 916 15641	22nF 10% 25V 0603
2996	3198 024 44730	47nF 50V 0603
2997	3198 024 44730	47nF 50V 0603

-ww-

3002	4822 051 30103	10kΩ 5% 0.062W
3003	4822 051 30223	22kΩ 5% 0.062W
3005	4822 051 30101	100Ω 5% 0.062W
3006	4822 051 30103	10kΩ 5% 0.062W
3007	4822 051 30222	2.2kΩ 5% 0.062W
3008	4822 051 30682	6.8Ω 5% 0.062W
3009	4822 051 30222	2.2kΩ 5% 0.062W
3010	4822 051 30331	330Ω 5% 0.062W
3014	4822 051 30102	1kΩ 5% 0.062W
3016	4822 117 13632	100kΩ 1% 0603 0.62W
3018	4822 051 30221	220Ω 5% 0.062W
3019	4822 051 30154	150kΩ 5% 0.062W
3201	4822 050 11002	1kΩ 1% 0.4W
3202	4822 051 30332	3.3Ω 5% 0.062W
3203	4822 051 30154	150kΩ 5% 0.062W
3204	4822 051 30332	3.3Ω 5% 0.062W
3205	4822 051 30102	1kΩ 5% 0.062W
3206	4822 051 30562	5.6kΩ 5% 0.063W 0603
3207	4822 051 30109	10Ω 5% 0.062W
3208	4822 051 30273	27kΩ 5% 0.062W
3209	4822 117 12917	1Ω 5% 0.062W
3210	4822 117 12917	1Ω 5% 0.062W
3211	4822 051 30273	27kΩ 5% 0.062W
3212	4822 051 30101	100Ω 5% 0.062W
3214	4822 051 30109	10Ω 5% 0.062W
3215	4822 116 52283	4.7kΩ 5% 0.5W
3216	4822 051 30109	10Ω 5% 0.062W
3217	4822 051 30103	10kΩ 5% 0.062W
3218	4822 051 30101	100Ω 5% 0.062W
3219	4822 051 30103	10kΩ 5% 0.062W
3220	4822 051 30151	150Ω 5% 0.062W
3221	4822 051 30271	270Ω 5% 0.062W
3222	4822 051 30331	330Ω 5% 0.062W
3224	4822 116 52298	680k 5% 0.5W
3225	4822 051 30471	47Ω 5% 0.062W
3226	4822 051 30101	100Ω 5% 0.062W
3227	4822 051 30101	100Ω 5% 0.062W
3228	4822 051 30101	100Ω 5% 0.062W
3229	4822 051 30152	1.5Ω 5% 0.062W
3230	4822 116 52175	100Ω 5% 0.5W
3231	4822 116 52175	100Ω 5% 0.5W
3232	4822 051 30562	5.6kΩ 5% 0.063W 0603
3233	4822 051 30101	100Ω 5% 0.062W
3234	4822 116 52175	100Ω 5% 0.5W
3235	4822 051 30102	1kΩ 5% 0.062W
3236	4822 051 30101	100Ω 5% 0.062W
3237	4822 051 30102	1kΩ 5% 0.062W
3238	4822 051 30472	4.7Ω 5% 0.062W
3239	4822 116 52263	2.7kΩ 5% 0.5W
3240	4822 051 30223	22kΩ 5% 0.062W
3241	4822 050 23903	39k 1% 0.6W
3242	4822 117 12925	47kΩ 1% 0.063W 0603
3244	4822 051 30101	100Ω 5% 0.062W
3247	4822 051 30391	390Ω 5% 0.062W
3248	4822 051 30101	100Ω 5% 0.062W
3249	4822 116 52175	100Ω 5% 0.5W
3250	4822 051 30222	2.2kΩ 5% 0.062W
3251	4822 051 30123	12kΩ 5% 0.1W
3253	4822 051 30101	100Ω 5% 0.062W
3255	4822 051 30101	100Ω 5% 0.062W
3256	4822 051 30101	100Ω 5% 0.062W
3257	4822 051 30101	100Ω 5% 0.062W
3258	4822 116 52175	100Ω 5% 0.5W
3260	4822 116 52175	100Ω 5% 0.5W
3261	4822 051 30472	4.7Ω 5% 0.062W
3262	4822 051 30101	100Ω 5% 0.062W
3263	4822 051 30101	100Ω 5% 0.062W
3265	4822 051 30101	100Ω 5% 0.062W
3266	4822 051 30101	100Ω 5% 0.062W
3267	4822 051 30101	100Ω 5% 0.062W
3269	4822 051 30101	100Ω 5% 0.062W
3270	4822 116 52219	330Ω 5% 0.5W
3271	4822 051 30101	100Ω 5% 0.062W
3272	4822 117 12968	820Ω 5% 0.62W
3273	4822 051 30102	1kΩ 5% 0.062W
3274	4822 116 52175	100Ω 5% 0.5W
3275	4822 116 52175	100Ω 5% 0.5W
3276	4822 116 52175	100Ω 5% 0.5W
3277	4822 116 52175	100Ω 5% 0.5W
3278	4822 116 52175	100Ω 5% 0.5W
3279	4822 051 30472	4.7Ω 5% 0.062W
3280	4822 051 30472	4.7Ω 5% 0.062W
3282	4822 051 30472	4.7Ω 5% 0.062W
3283	4822 051 30472	4.7Ω 5% 0.062W
3284	4822 051 30472	4.7Ω 5% 0.062W
3285	4822 051 30102	1kΩ 5% 0.062W
3287	4822 051 30101	100Ω 5% 0.062W
3289	4822 051 30101	100Ω 5% 0.062W
3291	4822 050 11002	1kΩ 1% 0.4W
3292	4822 117 12925	47kΩ 1% 0.063W 0603
3293	4822 051 30273	27kΩ 5% 0.062W
3295	5322 117 13056	8.2kΩ 1% 0.063W 0603
3296	4822 051 30562	5.6kΩ 5% 0.063W 0603
3297	4822 051 30223	22kΩ 5% 0.062W
3298	4822 051 30101	100Ω 5% 0.062W
3401	4822 050 24703	47kΩ 1% 0.6W
3402	4822 050 11002	1kΩ 1% 0.4W
3404▲	4822 117 11151	1Ω 5%
3412	4822 050 11002	1kΩ 1% 0.4W
3414	2322 194 63109	10Ω 5% 2W
3415	4822 116 52175	100Ω 5% 0.5W
3416	4822 051 30479	47Ω 5% 0.062W
3417	4822 053 11153	15kΩ 5% 2W
3418	4822 116 52175	100Ω 5% 0.5W
3419	4822 051 30682	6.8Ω 5% 0.062W
3420	4822 117 10833	10kΩ 1% 0.1W
3422▲	4822 117 11151	1Ω 5%
3423▲	4822 117 11151	1Ω 5%
3425	4822 050 21004	100kΩ 1% 0.6W
3427	4822 117 11449	2.2kΩ 5% 0.1W 0805
3428	4822 051 20332	2.3kΩ 5% 0.1W
3430	4822 053 20334	330kΩ 5% 0.25W
3431	4822 050 28203	82kΩ 1% 0.6W
3432	4822 053 11159	15Ω 5% 2W
3433	4822 050 21008	1Ω 1% 0,6W
3434	4822 050 21008	1Ω 1% 0,6W
3440	4822 116 52226	560Ω 5% 0.5W
3441	4822 053 20334	330kΩ 5% 0.25W
3442	3198 013 04720	4.7kΩ 0.5W
3443	3198 013 04720	4.7kΩ 0.5W
3445	4822 051 20479	47kΩ 5% 0.1W
3446	4822 051 30101	100Ω 5% 0.062W
3447	4822 116 52269	3.3kΩ 5% 0.5W
3451	4822 050 21204	120kΩ 1% 0,6W
3452	4822 051 30183	18kΩ 5% 0.062W
3453	4822 051 30333	33kΩ 5% 0.062W
3454	4822 116 83884	47kΩ 5% 0.5W
3456▲	4822 117 11151	1Ω 5%
3458▲	4822 052 11478	4.7Ω 5% 0.5W
3459▲	4822 117 11151	1Ω 5%
3460	4822 116 52256	2.2kΩ 5% 0.5W
3461	4822 116 52256	2.2kΩ 5% 0.5W
3462	4822 051 30222	2.2kΩ 5% 0.062W
3463	4822 051 30102	1kΩ 5% 0.062W
3464	4822 051 30391	390Ω 5% 0.062W
3465	4822 051 30391	390Ω 5% 0.062W
3466▲	4822 052 11108	1Ω 5% 0.5W
3467	4822 116 83872	220Ω 5% 0.5W
3468	4822 116 83872	220Ω 5% 0.5W
3469	4822 051 30102	1kΩ 5% 0.062W
3470	4822 116 52186	22Ω 5% 0.5W
3471	4822 050 23308	3.3Ω 1% 0.6W
3472	4822 050 23908	3.9Ω 1% 0.6W
3473	4822 051 30474	470kΩ 5% 0.062W
3474	4822 051 30153	15kΩ 5% 0.062W
3475	5322 117 13056	8.2kΩ 1% 0.063W 0603
3484▲	4822 052 10108	1Ω 5% 0.33W
3485▲	4822 052 10108	1Ω 5% 0.33W
3489	4822 051 20479	47kΩ 5% 0.1W
3490	4822 051 30223	22kΩ 5% 0.062W
3491	4822 117 12864	82kΩ 5% 0.6W
3493	4822 051 30222	2.2kΩ 5% 0.062W
3495	4822 051 20334	330kΩ 5% 0.1W
3497▲	4822 052 11338	3.3Ω 5% 0,5W
3498	4822 051 30472	4.7Ω 5% 0.062W
3499	4822 051 20684	680kΩ 5% 0.1W
3500▲	4822 053 21335	3.3MΩ 5% 0.5W
3501▲	4822 053 21335	3.3MΩ 5% 0.5W
3502	4822 116 83872	220Ω 5% 0.5W
3503	4822 252 11215	DSP301N-A21F
3504▲	4822 053 21155	1.5MΩ 5% 0.5W
3505▲	2122 550 00171	1mΩ 612V
3506▲	4822 053 21335	3.3MΩ 5% 0.5W
3507▲	2122 663 00021	9Ω 265V
3510▲	2122 612 00055	4.7Ω 3W
3511	4822 050 24708	4.7Ω 1% 0.6W
3512	4822 117 11817	1.2kΩ 1% 0.0625W
3513▲	4822 052 10222	2.2kΩ 5% 0.33W
3514▲	4822 052 10479	47Ω 5% 0.33W
3515	4822 050 11002	1kΩ 1% 0.4W
3516	4822 116 83303	0.1Ω 2W
3517	2322 704 63004	300KΩ
3518	4822 051 30332	3.3Ω 5% 0.062W
3519	4822 116 52244	15kΩ 5% 0.5W
3520	4822 117 11342	0.33Ω 5% 2W
3521	4822 116 52269	3.3kΩ 5% 0.5W
3522	4822 051 30563	56kΩ 5% 0.062W
3524	4822 117 12925	47kΩ 1% 0.063W 0603
3527	4822 117 12925	47kΩ 1% 0.063W 0603
3528	4822 051 20105	1MΩ 5% 0.1W
3529	4822 053 20225	2.2MΩ 5% 0.25W
3530	4822 051 30221	220Ω 5% 0.062W
3531	4822 116 52234	100kΩ 5% 0.5W
3532▲	4822 052 10478	4.7Ω 5% 0.33W
3533	5322 117 13056	8.2kΩ 1% 0.063W 0603
3534	4822 116 52175	100Ω 5% 0.5W
3537	4822 051 30222	2.2kΩ 5% 0.062W
3538	4822 051 20188	1.8Ω 5% 0.1W
3541	4822 117 12925	47kΩ 1% 0.063W 0603
3563	4822 116 83872	220Ω 5% 0.5W
3565	4822 051 30153	15kΩ 5% 0.062W
3571	4822 116 83872	220Ω 5% 0.5W
3572	4822 051 30221	220Ω 5% 0.062W
3573	4822 051 30153	15kΩ 5% 0.062W
3574	4822 116 52245	150kΩ 5% 0.5W
3575	4822 050 28203	82kΩ 1% 0.6W
3576	5322 117 13026	4.7kΩ 1% 0.063W 0603
3577	4822 116 52243	1.5kΩ 5% 0.5W
3578	4822 051 30471	47Ω 5% 0.062W
3579	4822 051 30222	2.2kΩ 5% 0.062W
3601	4822 051 30472	4.7Ω 5% 0.062W
3604	4822 051 30101	100Ω 5% 0.062W
3605	4822 051 30101	100Ω 5% 0.062W
3606	4822 116 52291	56kΩ 5% 0.5W
3607	4822 051 30103	10kΩ 5% 0.062W
3608	4822 051 30273	27kΩ 5% 0.062W
3609	4822 051 30331	330Ω 5% 0.062W
3614	4822 051 30101	100Ω 5% 0.062W
3616	4822 116 52175	100Ω 5% 0.5W
3617	4822 116 52175	100Ω 5% 0.5W
3618	4822 116 52175	100Ω 5% 0.5W
3634	4822 051 30102	1kΩ 5% 0.062W
3635	4822 117 12925	47kΩ 1% 0.063W 0603
3637	4822 051 30479	47Ω 5% 0.062W
3639	4822 116 52186	22Ω 5% 0.5W
3681	5322 117 13057	820Ω 1% 0.063W 0603
3684	5322 117 13036	1.2kΩ 1% 0.063W 0603
3685	4822 051 30151	150Ω 5% 0.062W
3686	4822 051 30391	390Ω 5% 0.062W
3687	5322 117 13046	1.8kΩ 1% 0.063W 0603
3690	4822 051 30221	220Ω 5% 0.062W
3691	4822 117 11817	1.2kΩ 1% 0.0625W
3692	4822 051 30272	2.7kΩ 5% 0.062W
3693	4822 051 30221	220Ω 5% 0.062W
3694	4822 051 30472	4.7Ω 5% 0.062W
3701	4822 116 83868	150Ω 5% 0.5W
3702	4822 117 12891	220kΩ 1%
3703	4822 116 52257	22kΩ 5% 0.5W
3704	4822 117 12925	47kΩ 1% 0.063W 0603
3705	4822 116 83868	150Ω 5% 0.5W
3706	4822 117 12891	220kΩ 1%
3707	4822 116 52257	22kΩ 5% 0.5W
3708	4822 117 12925	47kΩ 1% 0.063W 0603
3709	4822 116 52201	75Ω 5% 0.5W
3711	4822 051 30333	33kΩ 5% 0.062W
3712	4822 051 30682	6.8Ω 5% 0.062W
3713	4822 116 52201	75Ω 5% 0.5W
3715	4822 116 52201	75Ω 5% 0.5W
3717	4822 116 52201	75Ω 5% 0.5W
3718	4822 116 52219	330Ω 5% 0.5W
3719	4822 051 30689	68Ω 5% 0.063W 0603
3720	4822 051 30102	1kΩ 5% 0.062W
3721	4822 116 52201	75Ω 5% 0.5W
3731	4822 116 83868	150Ω 5% 0.5W
3732	4822 117 12891	220kΩ 1%
3733	4822 116 52257	22kΩ 5% 0.5W
3734	4822 117 12925	47kΩ 1% 0.063W 0603
3735	4822 116 83868	150Ω 5% 0.5W
3736	4822 117 12891	220kΩ 1%
3737	4822 116 52257	22kΩ 5% 0.5W
3738	4822 117 12925	47kΩ 1% 0.063W 0603
3739	4822 050 23303	33kΩ 1% 0.6W
3740	4822 051 30682	6.8Ω 5% 0.062W
3741	4822 116 52201	75Ω 5% 0.5W
3743	4822 116 52199	68Ω 5% 0.5W
3745	4822 116 52201	75Ω 5% 0.5W
3751	4822 116 83868	150Ω 5% 0.5W
3752	4822 117 12891	220kΩ 1%
3753	4822 116 83868	150Ω 5% 0.5W
3754	4822 117 12891	220kΩ 1%
3758	4822 116 52195	47Ω 5% 0.5W
3767	4822 117 11817	1.2kΩ 1% 0.0625W
3769	4822 117 11817	1.2kΩ 1% 0.0625W
3975	4822 053 11101	100Ω 5% 2W
3985	4822 051 30563	56kΩ 5% 0.062W
3988	4822 051 30103	10kΩ 5% 0.062W
3989	4822 051 30109	10Ω 5% 0.062W
3991	4822 051 30563	56kΩ 5% 0.062W
3992	4822 051 30103	10kΩ 5% 0.062W
3993	4822 051 30109	10Ω 5% 0.062W
3994	4822 051 30683	68kΩ 5% 0.062W
3995	4822 051 30472	4.7Ω 5% 0.062W

3996	4822 051 30681	680Ω 5% 0.062W
3997	4822 117 13632	100kΩ 1% 0603 0.62W
3998	4822 051 30103	10kΩ 5% 0.062W
4000	4822 051 30008	Jumper 0603
4001	4822 051 30008	Jumper 0603
4002	4822 051 30008	Jumper 0603
4011	4822 051 30008	Jumper 0603
4013	4822 051 30008	Jumper 0603
4015	4822 051 30008	Jumper 0603
4209	4822 051 30008	Jumper 0603
4212	4822 051 30008	Jumper 0603
4214	4822 051 30008	Jumper 0603
4221	4822 051 30008	Jumper 0603
4222	4822 051 30008	Jumper 0603
4223	4822 051 20008	Jumper 0805
4226	4822 051 30008	Jumper 0603
4227	4822 051 30008	Jumper 0603
4240	4822 051 30008	Jumper 0603
4241	4822 051 30008	Jumper 0603
4437	4822 051 30008	Jumper 0603
4470	4822 051 30008	Jumper 0603
4471	4822 051 30008	Jumper 0603
4472	4822 051 30008	Jumper 0603
4473	4822 051 30008	Jumper 0603
4474	4822 051 30008	Jumper 0603
4492	4822 051 30008	Jumper 0603
4533	4822 051 20008	Jumper 0805
4534	4822 051 30008	Jumper 0603
4535	4822 051 30008	Jumper 0603
4537	4822 051 30008	Jumper 0603
4581	4822 051 20008	Jumper 0805
4602	4822 051 30008	Jumper 0603
4604	4822 051 30008	Jumper 0603
4610	4822 051 30008	Jumper 0603
4612	4822 051 20008	Jumper 0805
4620	4822 051 30008	Jumper 0603
4631	4822 051 30008	Jumper 0603
4635	4822 051 30008	Jumper 0603
4637	4822 051 30008	Jumper 0603
4642	4822 051 30008	Jumper 0603
4644	4822 051 20008	Jumper 0805
4645	4822 051 30008	Jumper 0603
4646	4822 051 30008	Jumper 0603
4648	4822 051 30008	Jumper 0603
4649	4822 051 30008	Jumper 0603
4691	4822 051 30008	Jumper 0603
4692	4822 051 30008	Jumper 0603
4694	4822 051 30008	Jumper 0603
4696	4822 051 30008	Jumper 0603
4730	4822 051 30008	Jumper 0603
4910	4822 051 30008	Jumper 0603
4914	4822 051 20008	Jumper 0805
4915	4822 051 20008	Jumper 0805
4916	4822 051 20008	Jumper 0805
4917	4822 051 20008	Jumper 0805
4921	4822 051 20008	Jumper 0805
4992	4822 051 20008	Jumper 0805

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5001	2422 549 42896	Bead 120Ω 100MHz
5002	3198 018 34770	0.47µH 10% 0805
5201	4822 526 10704	Bead 100MHz
5202	2422 549 42896	Bead 120Ω 100MHz
5203	2422 549 42896	Bead 120Ω 100MHz
5205	2422 549 42896	Bead 120Ω 100MHz
5206	2422 549 42896	Bead 120Ω 100MHz
5207	2422 549 42896	Bead 120Ω 100MHz
5208	4822 526 10704	Bead 100MHz
5209	2422 549 42896	Bead 120Ω 100MHz
5210	2422 549 42896	Bead 120Ω 100MHz
5211	2422 549 42896	Bead 120Ω 100MHz
5212	2422 549 42896	Bead 120Ω 100MHz
5213	2422 549 42896	Bead 120Ω 100MHz
5214	2422 549 42896	Bead 120Ω 100MHz
5215	2422 549 42896	Bead 120Ω 100MHz
5216	4822 526 10704	Bead 100MHz
5217	4822 157 11835	4,7µH 5%
5295	4822 526 10704	Bead 100MHz
5401▲	2422 536 00425	Linearity coil 21"
5402	2422 531 02617	PSD12-205B B
5405	2422 536 00846	SC15334-00 B
5408	4822 157 11711	Choke coil
5410	4822 157 11737	22µH 10%
5500▲	4822 157 10476	DMF-2820H
5501▲	4822 157 11523	Line filter 5mH/2A
5511	4822 526 10704	Bead 100MHz
5512▲	2422 531 02634	SS42315-01 B
5531▲	2422 531 02631	SS22220-03 B
5551	4822 526 10704	Bead 100MHz
5552	4822 157 71401	27µH
5561	4822 526 10704	Bead 100MHz
5562	4822 526 10704	Bead 100MHz
5602	4822 157 11835	4,7µH 5%

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6001	4822 130 34142	BZX79-B33
6003	4822 130 11397	BAS316
6004	4822 130 11525	1SS356
6006	4822 130 34382	BZX79-B8V2
6203	4822 130 11397	BAS316
6204	9322 128 70685	SMSS14
6205	9340 548 69115	PDZ27B
6207	4822 130 11397	BAS316
6209	4822 130 80622	BAT54
6403	4822 130 10871	SBYV27-200
6404	9322 169 61687	DMV1500M
6406	9334 939 60673	RGP10G
6407	9322 197 45703	BAV21WS
6408	9322 197 45703	BAV21WS
6410	5322 130 31559	BY448
6441	9322 150 20685	BZX384-C68
6442	9322 150 20685	BZX384-C68
6443	4822 130 11551	UDZS10B
6450	4822 130 11397	BAS316
6451	4822 130 11148	UDZ4.7B
6452	4822 130 10871	SBYV27-200
6453	9334 939 60673	RGP10G
6454	9334 939 60673	RGP10G
6455	9334 939 60673	RGP10G
6456	4822 130 11045	PBYR10100
6457	4822 130 11397	BAS316
6458	4822 130 11397	BAS316
6459	9334 939 60673	RGP10G
6482	4822 130 11416	PDZ6.8B
6483	9322 197 45703	BAV21WS
6484	9322 197 45703	BAV21WS
6486	4822 130 30842	BAV21
6488	4822 130 11397	BAS316
6489	9340 548 71115	PDZ33B
6490	4822 130 11397	BAS316
6511	4822 130 31607	RGP10D
6512	4822 130 80622	BAT54
6514	4822 130 11397	BAS316
6531	4822 130 11522	UDZ15B
6532	9322 197 45703	BAV21WS
6533	9322 171 80685	BZX384-B6V8
6534	9322 199 75685	BZX384-B3V9
6535	9965 000 01541	SB160
6536	9322 198 25673	SB180
6538	4822 130 11397	BAS316
6541	9340 548 61115	PDZ12B
6551	9322 198 41687	STTH8L06D
6562	9322 161 78682	SB360L-7024
6563	9322 161 78682	SB360L-7024
6564	4822 130 11397	BAS316
6565	4822 130 11551	UDZS10B
6566	4822 130 11397	BAS316
6571	5322 130 34331	BAV70
6572	9340 548 54115	PDZ6.2B
6573	4822 130 30862	BZX79-B9V1
6575	4822 130 31878	1N4003G
6602	5322 130 34337	BAV99
6691	9322 050 99682	LTL-10224WHCR
6694	9340 548 52115	PDZ5.1B
6733	3198 020 55680	BZX384-C5V6
6990	4822 130 11397	BAS316

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7001	4822 130 63732	MMUN2212
7003	5322 130 42718	BFS20
7200	9352 747 92557	TDA12020H1/N1B10
7200	9352 747 93557	TDA12021H1/N1B10
7201	4822 130 62343	IMX1
7202	4822 130 11155	PDTC114ET
7203	4822 130 41246	BC327-25
7204	4822 130 41246	BC327-25
7207	5322 130 60159	BC846B
7208	5322 130 60159	BC846B
7209	9340 547 13215	BSH103
7210	9340 547 13215	BSH103
7404	9340 547 13215	BSH103
7405	9340 550 92127	BU4508DX
7406	9322 197 37676	KTC3228Y
7408	5322 130 60159	BC846B
7410	4822 130 60373	BC856B
7411	4822 130 60373	BC856B
7451	9322 195 14687	KTD600KY
7452	9322 197 37676	KTC3228Y
7453	9322 195 05687	KTB631KY
7454	5322 130 60159	BC846B
7455	4822 130 60373	BC856B
7456	4822 130 60373	BC856B
7482	3198 010 44010	PDTA114ET
7483	4822 130 60373	BC856B
7484	5322 130 60159	BC846B
7485	5322 130 60159	BC846B
7511	9352 720 43118	TEA1506T/N1
7512	9322 174 27687	FQPF7N80
7513▲	8238 274 02070	TCET1103G
7514	5322 130 60159	BC846B
7531	9352 739 52112	TEA1620P/N1
7532	4822 130 60373	BC856B
7541	4822 130 60373	BC856B
7561	9340 547 00215	PDTC143ZT
7571	4822 130 40959	BC547B
7573	4822 130 11155	PDTC114ET
7601	9322 147 25682	M24C16-WBN6
7603	4822 209 16978	LF33CV
7604	5322 130 60159	BC846B
7605	4822 130 41246	BC327-25
7606	5322 130 60159	BC846B
7701	5322 130 60159	BC846B
7702	5322 130 60159	BC846B
7703	5322 130 60159	BC846B
7705	9322 058 40685	SM IMT 1A
7706	5322 130 60159	BC846B
7707	5322 130 60159	BC846B
7708	5322 130 60159	BC846B
7709	5322 130 60159	BC846B
7990	4822 209 32641	TDA2616Q
7991	5322 130 60159	BC846B
7992	5322 130 60159	BC846B
7993	5322 130 60159	BC846B
7994	5322 130 60159	BC846B

CRT Panel [B]

Various

1254▲	2422 500 80086	Soc CRT 12P Female
1331	4822 265 41113	7P
1351	4822 265 30735	Connector 5p
1361	4822 267 10735	Connector 3p

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2330	4822 121 40518	100nF 10% 250V
2331	5322 126 11583	10nF 10% 50V 0603
2332	2020 558 90621	10nF 630V
2333	5322 126 11578	1nF 10% 50V 0603
2335	4822 122 32542	47nF 10% 63V
2351▲	2022 031 00241	10µ 250V
2352▲	4822 126 14505	4.7nF 10% 2KV
2363	4822 124 40764	22µF 100V
2364	4822 121 41664	22nF 10% 400V
2365	2238 916 15641	22nF 10% 25V 0603
2367	5322 121 42578	100nF 5% 250V
2368	4822 121 41664	22nF 10% 400V
2381	4822 124 40207	100µF 20% 25V
2388	4822 126 14241	330pF 0603 50V
2390	2238 586 59812	100nF 20% 50V 0603
2392	2238 586 59812	100nF 20% 50V 0603

-WW-

3331	4822 116 52175	100Ω 5% 0.5W
3332	3198 013 01020	1kΩ 20% 0.5W
3333	4822 116 52175	100Ω 5% 0.5W
3334	3198 013 01020	1kΩ 20% 0.5W
3335	4822 116 52175	100Ω 5% 0.5W
3336	3198 013 01020	1kΩ 20% 0.5W
3351▲	4822 052 10101	100Ω 5% 0.33W
3354	3198 013 01520	1.5kΩ 20% 0.5W
3356	4822 050 21009	10Ω 1% 0.6W
3357	2122 552 00004	1mA 18V 0603
3361	4822 117 11817	1.2kΩ 1% 0.0625W
3362	4822 050 24708	4.7Ω 1% 0.6W
3363	4822 117 12968	820Ω 5% 0.62W
3364	2122 101 02091	2.7Ω
3366	4822 116 52291	56kΩ 5% 0.5W
3367	4822 051 30563	56kΩ 5% 0.062W
3368	4822 117 12968	820Ω 5% 0.62W
3371	4822 116 52175	100Ω 5% 0.5W
3372	2322 750 62708	2.7Ω 1206
3373	4822 117 12473	4.7kΩ 5% 5W
3374	4822 051 30181	180Ω 5% 0.062W
3388	4822 051 30109	10Ω 5% 0.062W
3389	5322 117 11726	10Ω 5%
3394	4822 051 30221	220Ω 5% 0.062W
3397	4822 051 30472	4.7Ω 5% 0.062W
3398	4822 051 30221	220Ω 5% 0.062W
4328	4822 051 30008	Jumper 0603
4329	4822 051 30008	Jumper 0603

4330	4822 051 30008	Jumper 0603
4336	4822 051 20008	Jumper 0805
4337	4822 051 30008	Jumper 0603
4362	4822 051 30008	Jumper 0603

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5330	4822 526 10704	Bead 100MHz
5351	4822 157 50961	22µH
5352	2422 535 94257	0.22 µF

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6331	4822 130 30842	BAV21
6332	4822 130 30842	BAV21
6333	4822 130 30842	BAV21
6361	5322 130 34337	BAV99
6362	5322 130 34337	BAV99
6363	5322 130 34337	BAV99
6383	4822 130 31607	RGP10D

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7330	9352 636 45112	TDA6108AJF/N1C
7361	4822 130 40959	BC547B
7362	4822 130 44568	BC557B
7363	9322 166 55682	2SA1358
7364	9322 166 56682	2SC3421

Side A/V Panel + Headphone [D]

Various

1232	4822 267 51391	Connector Phone
1250	2422 026 05538	Soc cinch 3P
1251	2422 026 05494	7P Female
1252	2422 025 11244	Connector 7p m
1254	4822 267 10734	Connector 5p
1278	4822 267 10565	Connector 4p
1280	4822 267 10735	Connector 3p
1281	2422 025 16382	Connector 3p m
8254	3139 110 38861	Cable 5p/680/5p

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2171	4822 126 13512	330pF 10% 50V
2172	4822 126 13512	330pF 10% 50V
2173	4822 126 13512	330pF 10% 50V
2174	4822 126 13512	330pF 10% 50V
2175	4822 124 22652	2.2µF 20% 50V
2176	2238 586 59812	100nF 20% 50V 0603
2178	4822 126 13881	470pF 5% 50V
2180	4822 124 22652	2.2µF 20% 50V

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3150	4822 116 83884	47kΩ 5% 0.5W
3151	4822 116 52257	22kΩ 5% 0.5W
3152	4822 116 83884	47kΩ 5% 0.5W
3153	4822 116 52257	22kΩ 5% 0.5W
3154	4822 116 52201	75Ω 5% 0.5W
3156	4822 116 52231	820Ω 5% 0.5W
3157	4822 116 52231	820Ω 5% 0.5W
3158	4822 116 52201	75Ω 5% 0.5W
3159	4822 116 52175	100Ω 5% 0.5W
3160	4822 116 52175	100Ω 5% 0.5W

Top Control [E]

Various

1010	2422 025 16601	Connector 3p m
1010	4822 267 10748	Connector 3p
1011	4822 276 13775	Switch
1012	4822 276 13775	Switch
1013	4822 276 13775	Switch
1014	4822 276 13775	Switch
1015	4822 276 13775	Switch
8010▲	3104 311 05101	Cable 3P 680mm
8010	3139 131 01771	Cable 3p 1000mm

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3011	4822 051 30151	150Ω 5% 0.062W
3012	4822 051 30391	390Ω 5% 0.062W
3013	5322 117 13046	1.8kΩ 1% 0.063W 0603
3014	4822 051 30008	Jumper 0603
3015	5322 117 13057	820Ω 1% 0.063W 0603
3016	4822 051 30008	Jumper 0603
3017	5322 117 13046	1.8kΩ 1% 0.063W 0603
3018	5322 117 13057	820Ω 1% 0.063W 0603

LTI/CTI Interface [H]

Various

1206	2422 025 11244	Connector 7p m
1212	2422 025 16219	12P Male
8206	3139 110 39021	Cable 7P 180mm
8207	3104 311 07361	Cable 7P/560/7P
8207	3104 311 07801	Cable 7P 400mm
8280	3104 311 01241	Cable 5P 400mm
8280	4822 320 12669	Cable 5P 280mm
8361	3139 110 38531	Cable 3P 180mm
8682	3104 311 01111	Cable 3P 400mm

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2605	2238 586 59812	100nF 20% 50V 0603
2610	2238 586 59812	100nF 20% 50V 0603
2611	4822 124 12379	220µF 25V
2612	2238 586 59812	100nF 20% 50V 0603
2628	5322 126 11582	6.8nF 10% 63V
2630	2020 552 96305	4.7µF 20-80% 10V
2631	3198 017 41050	1µF 10V 0603
2634	4822 126 14221	68pF 5% 50V 0603 NP0
2638	3198 017 41050	1µF 10V 0603
2639	4822 122 33761	22pF 5% 50V
2643	2238 586 59812	100nF 20% 50V 0603
2645	2238 586 59812	100nF 20% 50V 0603

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3612	4822 050 11002	1kΩ 1% 0.4W
3613	4822 117 13632	100kΩ 1% 0603 0.62W
3614	4822 117 13632	100kΩ 1% 0603 0.62W
3615	4822 117 13632	100kΩ 1% 0603 0.62W
3616	4822 116 52175	100Ω 5% 0.5W
3617	4822 051 30101	100Ω 5% 0.062W
3626	4822 051 30102	1kΩ 5% 0.062W
3627	4822 051 30222	2.2kΩ 5% 0.062W
3628	4822 051 30102	1kΩ 5% 0.062W
3630	4822 051 30103	10kΩ 5% 0.062W
3631	4822 051 30103	10kΩ 5% 0.062W
3632	4822 051 30271	270Ω 5% 0.062W
3633	4822 117 11817	1.2kΩ 1% 0.0625W
3634	4822 051 30102	1kΩ 5% 0.062W
3635	4822 051 30101	100Ω 5% 0.062W
3637	4822 051 30105	1MΩ 5% 0.062W
3638	4822 051 30474	470kΩ 5% 0.062W
3639	4822 051 30479	47Ω 5% 0.062W
3640	4822 051 30102	1kΩ 5% 0.062W
3641	4822 051 30008	Jumper 0603
3642	4822 051 30102	1kΩ 5% 0.062W
3643	4822 051 30683	68kΩ 5% 0.062W
4610	4822 051 30008	Jumper 0603
4633	4822 051 20008	Jumper 0805
4634	4822 051 20008	Jumper 0805
4640	4822 051 30008	Jumper 0603
4641	4822 051 30008	Jumper 0603
4642	4822 051 30008	Jumper 0603
4680	4822 051 30008	Jumper 0603
4690	4822 051 30008	Jumper 0603

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5614	4822 157 10477	47µH

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6610	4822 130 11397	BAS316
6611	4822 130 11416	PDZ6.8B
6625	9322 102 64685	UDZ2.7B
6633	4822 130 11397	BAS316
6635	4822 130 11397	BAS316
6636	4822 130 11397	BAS316

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7610	4822 209 17311	TDA9178T/N1
7627	4822 209 73852	PMBT2369
7630	5322 130 60159	BC846B
7636	4822 130 63732	MMUN2212
7637	5322 130 60159	BC846B

Front Interface [J]

Various

1211	2422 025 16268	Connector 2p m
1231	2422 128 03111	Switch
1505	2422 025 16268	Connector 2p m
1693	2422 025 10738	Connector 6p m
8505▲	3104 311 03011	Cable 2p/340/2p Bk
8693	3139 110 38940	Cable 6P 340mm

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2691	4822 124 12379	220µF 25V
2698	5322 121 42386	100nF 5% 63V

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3500	4822 053 21335	3.3MΩ 5% 0.5W
3501	4822 053 21335	3.3MΩ 5% 0.5W
3691	4822 116 52207	1.2kΩ 5% 0.5W
3693	4822 116 83872	220Ω 5% 0.5W
3694	4822 116 52283	4.7kΩ 5% 0.5W

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6691	9322 050 99682	LTL-10224WHCR

11. Revision List

First release.